

# **I N D E X**

## **Volume - III**

**(From pages 3/9 – 498)**

### **ANNEXURE - RA/1 (Part-Iii)**

- |    |   |     |   |     |
|----|---|-----|---|-----|
| 3. | True photocopy along with typed copy of the relevant portion of the Oxford Pro Bono Publico submission dated Feb. 2013.   | 319 | - | 429 |
| 4. | <b><u>ANNEXURE - RA/2</u></b><br>True photocopy along with typed copy of the relevant portion of the contract agreement dated nil entered between M/s L-1 identity solutions and UIDAI, dated 24.08.2010. | 430 | - | 435 |
| 5  | <b><u>ANNEXURE - RA/3</u></b><br>True photocopy along with typed copy of the relevant portion of the Article taken by the petitioner from the Newspaper 'The Hindu' dated 15.12.2012.                     | 436 | - | 440 |
| 6. | <b><u>ANNEXURE - RA/4</u></b><br>True photocopy along with typed copy of the relevant portion of the Reply to RTI Application filed by the petitioner being No. PLNG/RTI/5127 dated 24..06.2015.          | 441 | - | 444 |
| 7. | <b><u>ANNEXURE - RA/5</u></b><br>True photocopy along with typed copy of the Reply to RTI Application filed by the petitioner being No. PLNG/RTI/5424 dated 06.12.2013.                                   | 445 | - | 449 |

8. **ANNEXURE - RA/6** 450 - 452
- True photocopy along with typed copy of the Reply to RTI Application filed by the petitioner being No. PLNG/RTI/7705 dated 25.06.2015.
9. **ANNEXURE - RA/7** 453 - 459
- True photocopy along with typed copy of the relevant portion of the of a press-release by the London School of Economic Department of Information System, titled 'An assessment of UK Identity Cards Bill and its implications: ID Cards-UK's high tech scheme is high risk' dated 27.06.2005.
10. **ANNEXURE - RA/8** 460 - 492
- True photocopy along with typed copy of the relevant portion of the paper titled 'Biometric Identification: Device Specification ad Actual Performance' Considered for the Operations of the UIDIA, authored by Hans Varghese Mathews published in December 2012.
11. **ANNEXURE - RA/9** 493 - 496
- True photocopy along with typed copy of RTI reply dated 13.11.2014 with Ref No. TC UID/Admin/RTI06/Vol XII/2014-2015.
12. **ANNEXURE - RA/10** 497 - 498
- True photocopy along with typed Copy of the Advertisement dated 13.01.2014 of Trident Group published in the Newspaper 'Economic Times'

Measurement	Definition	Target	Liquidated damages the Purchaser

## 7.2. Solution Related Performance Levels

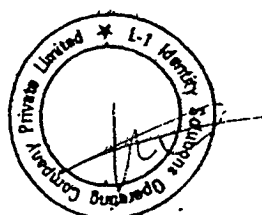
- i. For Solution details, refer to Annexure E – Scope of Work of the Contract and Section VII – Implementation Plan – Phasing & Transitioning.

- ii. **SLA Principles for Solution related performance levels:**

Following are the SLA principles adopted for Solution related performance levels

- a. The Performance targets for the Service Level Measurements during any period of assessment may not fixed for the entire contract period and may be revised for each period prior to the commencement of the period
- b. The performance on SLAs by Biometric Suppliers, shall be used as the basis for proportioning the allocation of transaction volumes across Biometric Suppliers
- c. The measurement on SLAs shall be based on assumption that all Biometric Suppliers shall be provided with identical hardware infrastructure, after acceptance as detailed in Annexure E.
  - o In case if the Biometric Solution Provider's requirement for server and storage during any of the 3 bands exceeds the maximum quantity provisioned by UIDAI, the Biometric Solution Provider shall compensate UIDAI on the cost for the additional hardware to be procured from its hardware supplier agency along with the associated costs on power, cooling and datacenter space and maintenance services. On the other hand, additional incentives for using less than prescribed hardware in each band above, for meeting the required number of allotted transactions, shall be provided to the Biometric Solution Provider. The plan for incentive shall be formulated by UIDAI keeping in view of reducing the overall cost.
- d. In case if a Biometric Supplier does not meet minimum performance limit on accuracy for De-duplication activity, the Biometric Supplier shall be kept under probation for a period of 6 (six) months, during which, no fresh allocation of transaction volumes shall be made to the Biometric Supplier.

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General Manager, Operations & Support  
Public Key Infrastructure Division  
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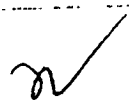
Measurement	Definition	Target	Liquidated damages
			<p>actual number of de-duplications undertaken till the date of measurement since last payment</p> <p>AND / OR</p> <p>Terminate the contract or a portion or part of the work thereof. The purchaser shall give 30 days notice to the Biometric Solution Provider of its intention to terminate the Contract and shall so terminate the Contract unless during the 30 days notice period, the Biometric Solution Provider initiates remedial action acceptable to</p>

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 B.B. Nanawati, DDC  
 Director, Information Technology & Public  
 Relations, Government of Karnataka  
 Bangalore





Measurement	Definition	Target	Liquidated damages payable for
			<ol style="list-style-type: none"> <li>1. Supply, installation and commission of Hardware</li> <li>2. Quarterly payment on actual number of de-duplications undertaken till the date of measurement since last payment</li> </ol>
Completion of acceptance and go-live Solution at both Primary and BCP sites.	Completion of acceptance testing and go-live of the solution to the satisfaction of the purchaser.	Within 84 calendar days from the date of release of Purchase Order	<p>Recover from the Biometric Solution Provider, as liquidated damages and not by way of Liquidated damages a sum equivalent to 2% of the Total fee payable for</p> <ol style="list-style-type: none"> <li>1. Supply, installation and commission of Hardware</li> <li>2. Quarterly payment on</li> </ol>


  
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Planning Commission, New Delhi  
Contact: 011-26121111



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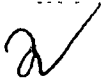
Measurement	Definition	Target	Liquidated damages
Installation and Commissioning of Hardware at Primary and BCP sites for testing and production	Delivery, installation, integration, testing of all components / equipments required for the system, to the satisfaction of the Purchaser as defined in Annexure E, Scope of Work	Within 63 calendar days from the date of release of Purchase Order	Recover from the Biometric Solution Provider, as liquidated damages and not by way of Liquidated damages a sum equivalent to 1% of the Total fee payable for  3. Supply, installation and commissioning of Hardware  4. Quarterly payment on actual number of de-duplications undertaken till the date of measurement since last payment
Installation and Commissioning of Solution in testing & production environments at Primary and BCP sites.	Delivery, installation, integration, testing of all components / equipments required for the system, to the satisfaction of the Purchaser as defined in Annexure E, Scope of Work	Within 70 calendar days from the date of release of Purchase Order	Recover from the Biometric Solution Provider, as liquidated damages and not by way of Liquidated damages a sum equivalent to 1% of the Total fee

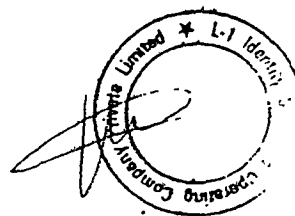
  
 D.D. Manawati, new  
 Director, Information Systems  
 Planning & Development  
 Government of India



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Measurement	Definition	Target	Liquidated damages
Team mobilization and commencement of work	<p>The Biometric Suppliers are expected to mobilize the team for commencement of work for this project.</p> <p>The commencement of work would mean reporting of Biometric Suppliers' resources at the designated UIDAI location for project &amp; implementation planning, design.</p>	Within 7 calendar days from the date of release of Purchase Order.	None
Completion of go-live of system for Proof of Concept at both Primary and BCP sites.	Completion of Roll-out of system would mean, Go-live of the system, such that all application and biometric solution providers are able to use the infrastructure, to the satisfaction of the purchaser.	Within 14 calendar days from the date of release of Purchase Order.	<p>Recover from the Biometric Solution Provider, as liquidated damages and not by way of Liquidated damages a sum equivalent to 1% of the Total fee payable for</p> <ol style="list-style-type: none"> <li>1. Supply, installation and commissioning of Hardware</li> <li>2. Quarterly payment on actual number of de-duplications undertaken till the date of measurement since last payment</li> </ol>

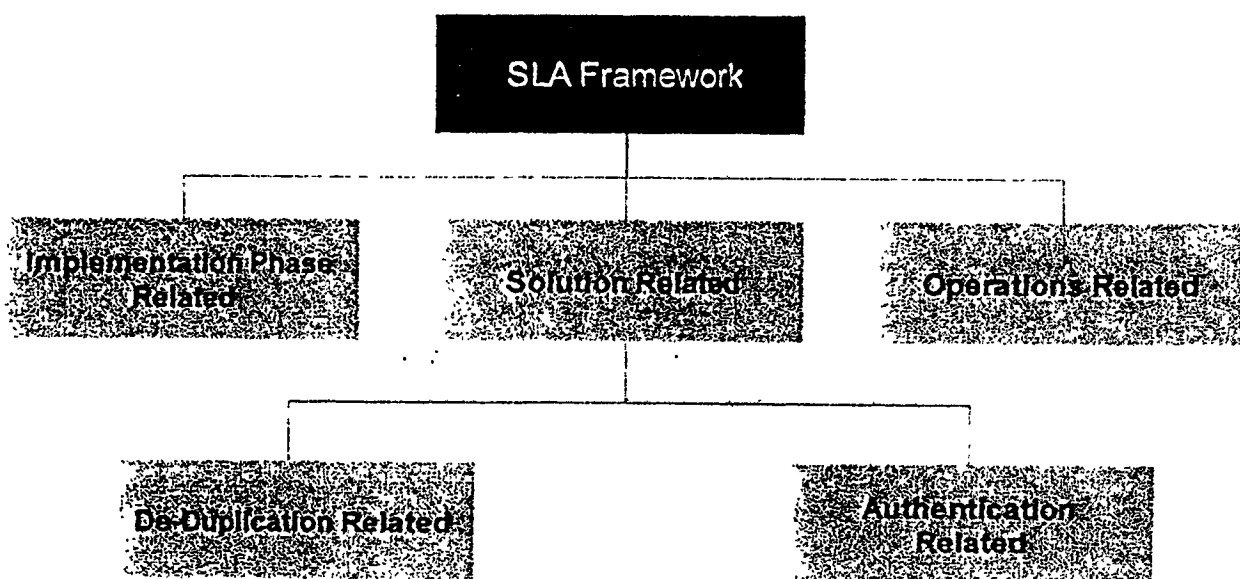
  
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 Deputy Director, Ministry of India  
 Financial Commission, New Delhi  
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- c. Performance Liquidated damages for not meeting a measurement parameter for two consecutive quarters shall result in twice the Liquidated damages percentage of that respective measurement parameter.
- d. Maximum Liquidated damages applicable for any quarter shall not exceed 40 % of the 'quarterly revenues' for the respective quarter
- e. Two consecutive quarterly deductions of 40 % of the quarterly revenues on account of any reason will be deemed to be an event of default and termination as per Clause 23 and 24 of the General Conditions of the Contract in Annexure A respectively and the consequences as provided in Clause 24 of the General Conditions of the Contract shall follow.

7. Measurements & Targets

- i. The diagram below summarizes the framework of measurements and targets proposed as part of this Service Level Agreement.



7.1. Implementation Phase related Performance Levels

Measurement	Definition	Target	Liquidated damages
Stage - Project Kick-off			

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 Director, Project Management  
 Department of Information Technology  
 Government of Karnataka



there is any confusion or conflict between the Contract and this document, the Tender and its addendums, the Contract will supersede.

#### 6.5.2.SLA change process

- i. The parties may amend this SLA by mutual agreement in accordance. Changes can be proposed by either party. The Biometric Suppliers' representative will initiate an SLA review at least bi-annually. Normally, the forum for negotiating SLA changes will be Purchaser's monthly meetings. Unresolved issues will be addressed using the issue management process described in Clause 8 of this document.
- ii. The Biometric Suppliers' representative will maintain and distribute current copies of the SLA document as directed by Purchaser. Additional copies of the current SLA will be available at all times to authorized parties.

#### 6.5.3.SLA version control

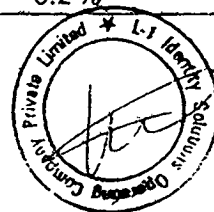
- i. All negotiated SLA changes will require changing the version control number. As appropriate, minor changes may be accumulated for periodic release (e.g. every quarter) or for release when a critical threshold of change has occurred.

#### 6.6. Liquidate Damages

- i. A maximum level of performance Liquidated damages is established and described below. The framework for performance Liquidated damages as a result of not meeting the Service Level Targets are detailed below:
  - a. A quarterly performance evaluation will be conducted using the three monthly reporting periods of that quarter.
  - b. Performance Liquidated damages shall be levied for not meeting each of the severity levels of performance as per the following table:

Severity Level	Liquidated damages as a percentage of quarterly revenues for the allocation cycle applicable
9	Event of default and termination as per Clause 23 and 24 of the General Conditions of the Contract in Annexure A respectively and the consequences as provided in clause 24 of the General Conditions of the Contract shall follow
8	8.0 %
7	4.0 %
6	2.0 %
5	1.0 %
4	0.5 %
3	0.4 %
2	0.3 %
1	0.2 %

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 Company Secretary  
 For L-1 Identity Solutions  
 Confidential



management level. Implementing this procedure ensures that Purchaser and Biometric Suppliers' management are communicating at the appropriate levels.

- ii. Escalation should take place on an exception basis and only if successful issue resolution cannot be achieved in a reasonable time frame.
  - a. Either Purchaser or Biometric Suppliers can initiate the procedure
  - b. The "moving party" should promptly notify the other party that management escalation will be initiated
  - c. Management escalation will be defined as shown in the contact map below
  - d. Escalation will be one level at a time and concurrently

#### 6.4.1. Contact Map

Name	Designation	Party	Contact
Mr. Srikanth Nandamuni	Head, Technology, UIDAI	Purchaser	+91 9740065015 (srikanth@egovernments.org)
Mr. Ajay Nandan	ADG, UIDAI	Purchaser	+91 11 23752670 (ajay@uidai.gov.in)
Mr. B. B. Nanawati	DDG, UIDAI	Purchaser	+91 11 23753706 (bbnanawati@uidai.gov.in)
Mr. Kalidindi R N R	Director, Business Development, L1 ID	Biometric Suppliers	+91 9177772876 (rkaliidindi@l1id.com)
Mr. Michael Van der Harst	Managing Director, L1 ID	Biometric Suppliers	+41 976154637 (mharst@l1id.com)
Mr. Richard Agostinelli	President, L1 ID	Biometric Suppliers	+1 6125320817 (ragostinelli@l1id.com)

#### 6.5. SLA change control

##### 6.5.1. General

- i. It is acknowledged that this SLA may change as Purchaser's business needs evolve over the course of the contract period. As such, this document also defines the following management procedures:
  - a. A process for negotiating changes to the SLA.
  - b. An issue management process for documenting and resolving particularly difficult issues.
  - c. Purchaser and Biometric Suppliers' management escalation process to be used in the event that an issue is not being resolved in a timely manner by the lowest possible level of management.
- ii. Any changes to the levels of service provided during the term of this Agreement will be requested, documented and negotiated in good faith by purchaser and Biometric Solution Provider. Purchaser or any of the Biometric Solution Provider can request a change. Changes will be documented as an addendum to this attachment and, consequently, the Contract. If

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B.B. Nanawati, nos  
The public interest in the security of the  
Purchaser's data is a matter of public concern  
Consequently, the Purchaser's data is a matter of public concern



- iii. Immediate action will be taken to identify problems and follow up with appropriate action to fix them as quickly as possible.

## 6.2. Reporting procedures

- i. The Biometric Suppliers' representative will prepare and distribute SLA performance reports in an agreed upon format by the 10<sup>th</sup> working day of subsequent month of the reporting period. The reports will include "actual versus target" SLA performance, a variance analysis and discussion of appropriate issues or significant events. Performance reports will be distributed to Purchaser management personnel as directed by Purchaser.

## 6.3. Issue management procedures

### 6.3.1. General

- i. This process provides an appropriate management structure for the orderly consideration and resolution of business and operational issues in the event that quick consensus is not reached between Purchaser and Biometric Suppliers. It is expected that this pre-defined process will only be used on an exception basis if issues are not resolved at lower management levels.

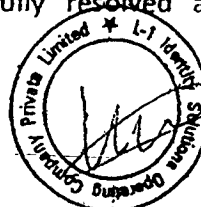
### 6.3.2. Issue management process

- i. Either Purchaser or Biometric Suppliers may raise an issue by documenting the business or technical problem, which presents a reasonably objective summary of both points of view and identifies specific points of disagreement with possible solutions.
- ii. Purchaser and the Biometric Suppliers' representative will determine which committee or executive level should logically be involved in resolution. A chain of management escalation is defined in Clause 6.4 of this document.
- iii. A meeting or conference call will be conducted to resolve the issue in a timely manner. The documented issues will be distributed to the participants at least 24 hours prior to the discussion if the issue is not an emergency requiring immediate attention.
- iv. Management of Purchaser and Biometric Suppliers will develop a temporary, if needed, and the permanent solution for the problem at hand. The Biometric Suppliers will then communicate the resolution to all interested parties.
- v. In the event a significant business issue is still unresolved, the arbitration procedures described in the Contract will be used.

## 6.4. Management escalation procedures and contact map

- i. The purpose of this escalation process is to provide a quick and orderly method of notifying both parties that an issue is not being successfully resolved at the lowest possible

B.B. Nanawati, doc  
 Head of ...  
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## 5. Categories of Service Levels

- i. The Service Level Agreement (SLA) has been logically segregated in the following categories:
  - a. Implementation phase related performance levels
  - b. Solution related performance levels
  - c. Operations related
    - o Manpower Availability
    - o Reporting

## 6. SLA Framework

- i. This section describes the SLA framework for this contract comprising of the following:
  - a. Responsibilities of parties
  - b. Reporting procedures
  - c. Issue management procedures
  - d. Management escalation and contact map
  - e. SLA change control
  - f. Liquidated damages


### 6.1. Responsibilities of parties

#### 6.1.1. Responsibilities of purchaser

- i. Purchaser is responsible for:
  - a. Reporting defects and problems to the Biometric Suppliers' representative as soon as possible
  - b. Assisting Biometric Suppliers in managing the SLA
  - c. Providing early warning of any organizational, functional or technical changes that might affect Biometric Supplier ability to deliver the services described in the SLA
  - d. Assisting Biometric Suppliers in a timely manner in resolving production incidents

#### 6.1.2. Responsibilities of Biometric Suppliers

- i. Biometric Suppliers is responsible for delivering the services described in Annexure E, Scope of Work document to the performance targets detailed in this document.
- ii. Additionally, Biometric Suppliers are responsible for:
  - a. Reporting problems to Purchaser management as soon as possible
  - b. Assisting Purchaser in managing the SLA
  - c. Providing early warning of any organizational, functional or technical changes that might affect Biometric Suppliers' ability to deliver the services described in the SLA
  - d. Assisting Purchaser in a timely manner in resolving production incidents

  
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 Director General of Security  
 Ministry of Home Affairs  
 Government of India





size will be specified. As no failure-to-enrol decisions will be permitted for residents with any of the 12 biometrics available, failure-to-enrol rates are presumed to be zero and will not be considered in computing the false negative identification rate. Data from residents with none of the 12 biometrics will be exempted from the calculation of this rate.


- g. **"False Acceptance"** A term applying to verification transactions only. The decision of a biometric system that submitted biometric samples match enrollment data from a different data subject.
- h. **"False Match Rate"** A term applying to verification transactions only. The ratio of number of verification transactions conducted by data subjects resulting in a false match to the total number of transactions. The definition of "transaction" shall be given by the respondent, with the provision that the same definition is used in determining "False Match Rate".
- i. **"False Rejection"** A term applying to verification transactions only. The decision of a biometric system that submitted biometric samples do not match enrollment data of the same data subject.
- j. **"False Non Match Rate"** A term applying to verification transactions only. The ratio of number of verification transactions conducted by data subjects resulting in a false non match to the total number of transactions. The definition of "transaction" shall be given by the respondent, with the provision that the same definition is used in determining "False Non Match Rate".

### 3. Description of Services Provided

- i. The exact scope and boundaries of services provided as part of this Contract Agreement are detailed in Annexure E and Annexure therein of this tender.

### 4. Service Level Agreements & Targets

- i. This section is agreed to by the Purchaser and Biometric Suppliers as the key performance indicator for this engagement. This may be reviewed and revised according to the procedures detailed in Clause 6.5, SLA Change Control. The following section reflects the measurements to be used to track and report systems performance on a regular basis. The targets shown in the following tables are for the period of contract or its revision whichever is earlier. The procedures in Clause 6 will be used if there is a dispute between Purchaser and Biometric Suppliers on what the performance targets should be.
- ii. The Service Level Agreements shall not be applicable for services in phase(s) preceding and including implementation of Release 2 as stated in Annexure E and annexure therein of the bid document.

  
**B.B. Nanawati, ugc**  
 Director for Implementation of the City of India  
 Planning Commission, New Delhi  
 Contact: 011-26110001




## Service Level Agreement

### 1. Purpose of this Agreement

- i. The purpose of this agreement is to define the levels of service to be provided by Biometric Suppliers to Purchaser for the duration of this contract or until this SLA has been amended.
- ii. This SLA is intended to
  - a. Trigger a process that applies Purchaser and Biometric Suppliers' management attention to some aspect of performance only when that aspect drops below an agreed upon threshold, or target
  - b. Make explicit the expectations that the purchaser has for performance
  - c. Help Purchaser control the levels and performance of services

### 2. Definitions

- i. For generic definitions, please refer to 'General Conditions of Contract'.
- ii. Below are definitions specific to this SLA document.
  - a. **"Enrolment Transactions"** The transaction related to the successful de-duplication check to establish if there exist any duplicate(s) for one subject to be enrolled.
  - b. **"Allocation Cycle"** The period for which the allocation of transactions volumes to biometric suppliers remains fixed. The cycle duration shall be 3 months or till 1 Crore new enrolment transactions are made, whichever is earlier.
  - c. **"False Positive Identification"** A term applying to de-duplication transactions only. An incorrect decision of a biometric system that an applicant for a UID has previously been enrolled in the system, when in fact they have not.
  - d. **"False Positive Identification Rate (FPIR)"** A term applying to de-duplication transactions only. The ratio of number of false positive identification decisions to the total number of enrollment transactions by unenrolled individuals. This rate is expected to depend upon the size of the enrolled database and the database binning/partitioning used. Enrolled database size will be specified.
  - e. **"False Negative Identification"** A term applying to de-duplication transactions only. An incorrect decision of a biometric system that an applicant for a UID, making no attempt to avoid recognition, has not previously been enrolled in the system, when in fact they have. This failure to match might be caused by any algorithm in use by the system (segmentation, comparison, binning, quality, etc.).
  - f. **"False Negative Identification Rate (FNIR)"** A term applying to de-duplication transactions only. The ratio of number of false negative identification decisions to the total number of enrollment transactions by enrolled individuals. This rate is expected to depend upon the database binning/partitioning used to meet throughput requirements. Enrolled database

  
 B.B. Nanawati, ops  
 Director, Operations & Maintenance  
 Project Management Office  
 Central Government



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# Annexure C

## Service Level Agreement

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B.S. Nanawati, Secy  
Corporate Governance & Secretary to the  
Joint Working Committee on Corporate Governance,  
Connaught Place, New Delhi-110028



**6. Adherence to disclosure norms**


- 6.1. UID is entitled to audit any amount claimed by the Biometric Solution Provider in an invoice submitted to UID, and/or require the Biometric Solution Provider to disclose any document, material, data, and/or information in relation to the Agreement.

**7. Compliance to requirement of technical queries in relation to performance and system behavior**

- 7.1. Biometric Solution Provider will provide UID with support services (including but not limited to addressing any technical query raised by UID) as and when reasonably sought by the UID, in relation to use of the software, performance of services by Biometric Solution Provider, or any matter relating to them.

**8. Compliance to Indian IT Act 2008 and amendments thereof; UIDAI Act, if any passed by Government of India at a future date**

- 8.1. The Biometric Solution Provider undertakes that during the term of this Agreement, it shall:-
- i. comply with all applicable laws and regulations as amended from time to time, in the performance of its obligations; and
  - ii. hold all valid and current licenses required to perform the services, in relation to this Agreement and any matter relating to them.

  
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Unique Identification Authority of India  
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Contact No. 011-23011001



## 2. Escrow

- 2.1. "Upon UID's written request, and pursuant to a mutually-agreeable, industry-standard escrow agreement, from the time of commencement of the contract for a period up to 2 years after expiry of contract, Biometric Solution Provider shall place in escrow: a copy of the source code for the Software, consisting of a full source language statement of the program or programs comprising the Software, in a form suitable for reproduction and use by computer; complete program maintenance documentation, including all technical manuals, release notes; and all other material necessary to allow a reasonably skilled programmer or analyst to understand, maintain, modify and enhance the Software without Biometric Solution Provider's assistance or reference to any other materials. The escrow agreement shall, at a minimum, provide for release of the source code to UID in the event Biometric Solution Provider ceases to do business as an ongoing concern or in the event of breach of contract by the Biometric Solution Provider. Biometric Solution Provider shall be responsible for all fees of the escrow agent."

## 3. Privacy of data


- 3.1. In course of the Agreement, the Biometric Solution Provider may collect, use, transfer, store or otherwise process (collectively, "process") information that pertains to specific individuals and can be linked to them ("personal data"). Biometric Solution Provider warrants that it shall process all personal data in accordance with applicable law and regulation. Biometric Solution Provider further warrants that it shall process such personal information only for the purposes of this Agreement, and shall not use or disclose such information, otherwise pursuant to purposes of the Agreement.

## 4. Right for security clearance

- 4.1. UID may execute background checks on any or all employees of the Biometric Solution Provider who are assigned to work on the project. Such background checks will include drug screening and checks for criminal activity, credit history checks, and checks on qualifications, suitability and experience of Biometric Solution Provider's employees before and/or during their assignment to the project under this Agreement.


## 5. Opening of registered office in India

- 5.1. The Biometric Solution Provider should have an office in India in the form of a registered office.

  
 B.B. Nanawati, CEO  
 Director, UID  
 Director, UID  
 Director, UID



- XXV. "Effective Date" means the date on which this Contract is signed and executed by the parties hereto. If this Contract is executed in parts, then the date on which the last of such Contracts is executed shall be construed to be the Effective Date;
- XXVI. "Intellectual Property Rights" means any patent, copyright, trademark, trade name, service marks, brands, propriety information, UIDAI Application Software whether arising before or after the execution of this Contract and the right to ownership and registration of these rights.
- XXVII. "Kick Off Meeting" means a meeting convened by the Purchaser to discuss and finalize the work execution plan and procedures with the Biometric Solution Provider.
- XXVIII. "Service" means services to be provided as per the Annexure E - Scope of Work as specified in this bid document and incidental services, such as design, supply and implementation or any other such obligations of the Biometric Solution Provider covered under the Contract. In addition to this, the definition would also include other related/ancillary services that may be required to execute the Scope of Work under this contract.
- XXIX. "Service Specification" means and includes detailed description, statements to technical data, performance characteristics, and standards (Indian as well as International) as applicable and as specified in the Contract, as well as those specifications relating to Industry standards and codes applicable to the performance of the work, work performance quality and specifications affecting the work or any additional specification required to be produced by the Biometric Solution Provider to meet the design criteria/ and/ or contract requirements.
- XXX. "The Contract Value" means the unit price per allotment enrollment transactions times maximum of 10 Crore allotted enrollment transactions during contract period notwithstanding the rules of dynamic allocation as per Annexure D – Work allocation & Service Levels.
- XXXI. "Notice" means:
- i. a notice; or
  - ii. a consent, approval or other communication required to be in writing under this Contract.

  
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 Connaught Place, New Delhi, India



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indirectly by the Biometric Solution Provider for the purposes of this Bid / Contract.

- XV. **"Biometric Solution Provider's Representative/ Project Coordinator"** means the person or the persons appointed by the Biometric Solution Provider from time to time to act on its behalf for overall co-ordination, supervision and project management.
- XVI. **"Parties"** means the Purchaser and, the Biometric Solution Provider, and **"Party"** means either of the Parties.
- XVII. **"Contract"** means the Agreement entered into between the Purchaser and the Biometric Solution Provider including all attachments and Annexes thereto, the Bid and all Annexes thereto and the agreed terms as set out in the Bid, all documents incorporated by reference therein and amendments and modifications to the above from time to time.
- XVIII. **"De-Duplication"** means assurance through biometric comparisons that no enrolled person has been assigned more than one Unique ID number.
- XIX. **"Enrolment Transactions"** mean the transaction to perform de-duplication check in order to establish if there exists any duplicate(s) for the subject to be enrolled.
- XX. **"Allotted Enrolment Transactions"** mean the transaction allocated to a Biometric Solution to perform de-duplication in order to check if there exist any duplicate(s) for the subject being enrolled.
- XXI. **"Goods"** means all of the equipment, sub-systems, hardware, software, products accessories and/or other material / items which the Biometric Solution Provider is required to supply, install and maintain under the contract.
- XXII. **"System"** means all of the goods under the scope of this contract together as an integrated solution.
- XXIII. **"Commissioning of System"**: The system shall be deemed to have been commissioned, when all the activities as defined in Clause 9.3 under Annexure E - Scope of Work have been successfully executed and completed.
- XXIV. **"Acceptance of System"**: The system shall be deemed to have been accepted by the Purchaser, subsequent to its commissioning, when all the activities as defined in Clause 10 under Annexure E - Scope of Work have been successfully executed and completed.

✓  
B.B. Nanawati, DDC,  
Unique Identification Authority of India  
Planning Commission, New Delhi  
Connaught Circus, New Delhi - 110001



- VIII. **"Purchaser's Representative/Project Coordinator"** means the person or the persons appointed by the Purchaser from time to time to act on its behalf for overall co-ordination, supervision and project management.
- IX. **"Primary Site"** means the Central ID Data Repository ("CIDR") Data Center in Delhi that would house the Information and Communication Technology (ICT) equipment required for carrying out the centralized operations of CIDR.
- X. **"BCP Site"** means the Business Continuity Site of the CIDR located at a Data Centre in Bangalore that would house ICT equipment similar to the Primary site and which would be capable of running business operations of the CIDR in case of an eventuality.
- XI. **"Datacenter Sites"** means the Primary and BCP site of the CIDR including their respective Data Center space, Communications Room and Non-Data Centre space wherein the delivery, installation, integration, management and maintenance services as specified under the **Annexure E - Scope of Work** are to be carried out for the purpose of this Contract. Each individually referred to as Datacenter Site and collectively as Datacenter Sites.
- XII. **"Prime Consortium Member"** means the Prime Member of the Consortium, in case of a consortium bid. For the purpose of this contract **Prime Consortium Member** means the **Biometric Solution Provider**.
- XIII. The **"Biometric Solution Provider"** means the successful bidder whose bid has been accepted by the Purchaser and with whom the order for providing a turnkey solution towards Design, Supply and Implementation of Biometric Matching Services has been placed as per requirements and terms and conditions specified in this Bid/contract and shall be deemed to include the Biometric Solution Provider's successors, representatives (approved by the Purchaser), heirs, executors, administrators and permitted assigns, as the case may be, unless excluded by the terms of the contract.
- XIV. **"Biometric Solution Provider's Team"** means the Successful Bidder alone or along with all of its consortium members, who have to provide goods & services to the Purchaser under the scope of this Bid / Contract. This definition shall also include any and/or all of the employees of the Prime Consortium Member, consortium members, authorized service providers/partners/agents and representatives or other personnel employed or engaged either directly or

✓  
B.B. Nanawati, doc  
Under Secretary to the Government of India  
Planning Commission, New Delhi  
Contract No. 1/2001






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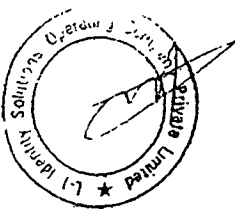
## Special Conditions

### 1. Definitions

- I. **"Acceptance of Bid"** means the letter/fax or any memorandum communicating to the bidder, the acceptance of his bid, and includes an advance acceptance of his bid.
- II. **"Business Day"** means any day that is not a Sunday or a public holiday (as per the official holidays observed by UIDAI).
- III. **"Confidential Information"** means any information disclosed to or by any Party to this Contract and includes any information in relation to the Parties, a third party any other person any such information that may come to the knowledge of the Parties hereto / Biometric Solution Provider's Team by virtue of this Contract that:
  - a. is by its nature confidential or by the circumstances in which it is disclosed confidential; or
  - b. is designated by the disclosing Party as confidential or identified in terms connoting its confidentiality;but does not include information which is or becomes public knowledge other than by a breach of this Contract;
- IV. **"The Purchaser"** means the President of India acting through the Director General, Unique Identification Authority of India (UIDAI), Planning Commission, Government of India
- V. **"Purchase Officer"** means the officer signing the acceptance of bid and includes any officer who has authority to execute the relevant contract on behalf of the Purchaser.
- VI. **"UIDAI"**, means the Director General, Unique Identification Authority of India (UIDAI) or any other representative authorized by the Director General, UIDAI and also including the officer of the UIDAI across India.
- VII. **"Document"** means any embodiment of any text or image however recorded and includes any data, text, images, sound, voice, codes or and databases or microfilm or computer generated micro fiche.

  
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For and on behalf of the Government of India  
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B.B. Nannawati, DDC  
District Collector, District  
Muzaffargarh, Punjab  
Pakistan

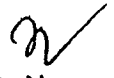
Annexure B  
Special Conditions

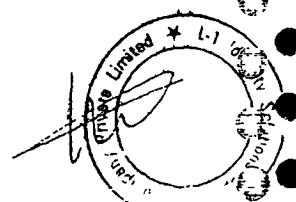
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completion, corresponding with the delay caused by any such suspension of the works as aforesaid shall be granted to M/s L-1 Identity Solutions Operating Company, if request for same is made and that the suspension was not consequent to any default or failure on the part of M/s L-1 Identity Solutions Operating Company. In case the suspension of works, is not consequent to any default or failure on the part of M/s L-1 Identity Solutions Operating Company, and lasts for a period of more than 2 months, M/s L-1 Identity Solutions Operating Company shall have the option to request the Purchaser to terminate the Contract with mutual consent.

- 49.2 In the event that the Purchaser suspends the progress of work for any reason not attributable to M/s L-1 Identity Solutions Operating Company for a period in excess of 30 days in aggregate, rendering M/s L-1 Identity Solutions Operating Company to extend his performance guarantee then Purchaser shall bear only the cost of extension of such bank guarantee for such extended period restricted to the normal bank rates as applicable in the banking procedures subject to M/s L-1 Identity Solutions Operating Company producing the requisite evidence from the bank concerned.

  
E.S. Nanawati, CEO  
L-1 Identity Solutions Operating Company  
Plot No. 1, Sector 1, Gurgaon, Haryana  
122001, India




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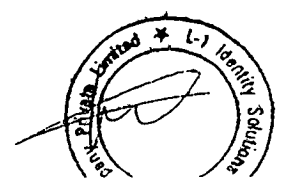
Severity Level	Penalty as a percentage of quarterly revenues for the allocation cycle applicable
9	Event of default and termination as per Clause 23 and 24 of the General Conditions of the Contract in Annexure A respectively and the consequences as provided in clause 24 of the General Conditions of the Contract shall follow
8	8.0 %
7	4.0 %
6	2.0 %
5	1.0 %
4	0.5 %
3	0.4 %
2	0.3 %
1	0.2 %

- c. Performance Penalty for not meeting a measurement parameter for two consecutive quarters shall result in twice the penalty percentage of that respective measurement parameter.
- d. Maximum Penalty applicable for any quarter shall not exceed 40 % of the 'quarterly revenues' for the respective quarter
- e. Two consecutive quarterly deductions of 40 % of the quarterly revenues on account of any reason will be deemed to be an event of default and termination as per Clause 23 and 24 of the General Conditions of the Contract in Annexure E respectively and the consequences as provided in Clause 24 of the General Conditions of the Contract shall follow.

49. Suspension of Work

49.1 M/s L-1 Identity Solutions Operating Company shall, if ordered in writing by the Purchaser's Representative, temporarily suspend the works or any part thereof for such a period and such a time as ordered. M/s L-1 Identity Solutions Operating Company shall not be entitled to claim compensation for any loss or damage sustained by him by reason of temporary suspension of the Works as aforesaid. The Purchaser may consider suitable compensation to M/s L-1 Identity Solutions Operating Company on case to case basis, to the extent of work completed, subject to fulfillment of other conditions of this contract. An extension of time for

  
 B.B. Nanawati, **DDO**  
 The Punjab State Milk Producers' Cooperative Societies Union Ltd.,  
 11/11/11, Ganga Road, Jalandhar (Punjab),  
 Ganga Road, Jalandhar (Punjab)



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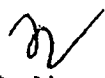
47. Severance

47.1 In the event any provision of this Contract is held to be invalid or unenforceable under the applicable law, the remaining provisions of this Contract shall remain in full force and effect.

48. Liquidated Damages

48.1 A maximum level of performance penalties is established and described below. The framework for performance penalties as a result of not meeting the Service Level Targets are detailed below:


- a. A quarterly performance evaluation will be conducted using the three monthly reporting periods of that quarter.
- b. Performance penalties shall be levied for not meeting each of the severity levels of performance as per the following table:

  
E. B. Nanawati, CEO  
L-1 Identity Solutions Company Private Limited  
100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000



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Payment Schedule			
S.No	Payment Items	Payment Values	Time of Disbursement
1	Hardware	50 % of INR 5 Crores	On delivery and installation of hardware at Primary and BCP site as per the Bill of Quantity submitted by M/s L-1 Identity Solutions Operating Company
		25 % of INR 5 Crores	On the acceptance of the Solution by UIDAI as per Annexure E – Scope of Work
		25 % of INR 5 Crores	On completion of first 1 Crore allotted enrolment transactions
2	De-duplications	As per actual number of de-duplications based on unit price per allotted enrolment transaction	Quarterly as per actual number of de-duplications

  
B.D. Nanawati, for


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or resources, which M/s L-1 Identity Solutions Operating Company has not committed to any other Account.

- 46.6.4 Purchaser reserves the right to seek any information from M/s L-1 Identity Solutions Operating Company in this context at any time during the currency of contract M/s L-1 Identity Solutions Operating Company shall provide "Most Preferred Customer" status to the Purchaser. Accordingly, the prices payable for goods and services that are part of this contract shall in no event exceed the lowest price at which M/s L-1 Identity Solutions Operating Company offers similar goods or services to any other customer during the currency of the contract.

  
B.B. Nanawati, DDO  
District Revenue Officer, District of India  
District of Gujarat, District of India  
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#### 46. Payment Schedule

46.1 The contract value shall comprise of two components, viz payment as per actuals on the de-duplications undertaken by M/s L-1 Identity Solutions Operating Company based on unit price per allotted enrolment transaction finalized and payment of fixed amount of INR 5 Crores (Five Crore rupees) for the supply, installation commission of hardware for the capacity to cater to the first 1 Crore enrolment transactions.

46.2 Payments will be released to M/s L-1 Identity Solutions Operating Company only on satisfactory acceptance of the solution and deliverables:

46.3 All Payments shall be subject to provisions of Clauses 48.

#### 46.4 Payment schedule

46.5 Prices shall remain firm and shall not be subject to any upward revision on any account whatsoever throughout the period of contract. Purchaser however reserves the right to review and negotiate the charges payable for Maintenance and support services of the system at the beginning of the each year or at any time at the request of Purchaser whichever is earlier to incorporate downward revisions as applicable and necessary.

#### 46.6 Most Preferred Customer

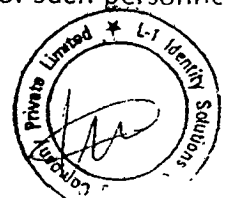
46.6.1 M/s L-1 Identity Solutions Operating Company shall provide "Most Preferred Customer" status to the Purchaser. Accordingly, the prices payable for goods and services that are part of this contract shall in no event exceed the lowest price at which M/s L-1 Identity Solutions Operating Company has offered similar goods or services of comparable volumes to any other customer in the Republic of India at the time of placement of order by Purchaser.

46.6.2 After acceptance of the system, any offer made by M/s L-1 Identity Solutions Operating Company regarding further procurement of goods or services to the Purchaser shall be at competitive prices and not higher than as offered to any other customer in the Republic of India, for comparable volumes, at that point in time.

46.6.3 During the currency of the Contract, if the Purchaser requests services which require provisioning of additional personnel or resources by M/s L-1 Identity Solutions Operating Company, M/s L-1 Identity Solutions Operating Company should give highest priority to the Purchaser for provisioning of such personnel

B.B. Nanawati, DGS

Director, Information & Publicity of India  
Ministry of Information & Publicity,  
Government of India, New Delhi





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- ii. assets of M/s L-1 Identity Solutions Operating Company and property used in the performance of the Services, and
  - iii. any documents prepared by M/s L-1 Identity Solutions Operating Company in the performance of the Services.
  - i. shall pay all premia in relation thereto and shall ensure that nothing is done to make such insurance policies void or voidable
  - ii. at the Purchaser's request, shall provide evidence to the Purchaser showing that such insurance has been taken out and maintained and that the current premiums
- 44.5 therefore have been paid Employer's liability and workers' compensation insurance in respect of the Personnel of M/s L-1 Identity Solutions Operating Company/ Team of M/s L-1 Identity Solutions Operating Company, in accordance with the relevant provisions of the Applicable Law, as well as, with respect to such Personnel, any such life, health, accident, travel or other insurance as may be appropriate; and

✓ 45. **Limitation of Liability of M/s L-1 Identity Solutions Operating Company towards the Purchaser**

45.1 Except in case of gross negligence or willful misconduct on the part of M/s L-1 Identity Solutions Operating Company / Team of M/s L-1 Identity Solutions Operating Company or on the part of any person or company acting on behalf of M/s L-1 Identity Solutions Operating Company in executing the work or in carrying out the Services, M/s L-1 Identity Solutions Operating Company, with respect to damage caused by M/s L-1 Identity Solutions Operating Company to property and/or assets of the Purchaser or of any of Purchaser's vendors, shall not be liable to Purchaser.

- (i) for any indirect or consequential loss or damage; and
- (ii) for any direct loss or damage that exceeds (A) twice the Contract Value, or (B) the proceeds M/s L-1 Identity Solutions Operating Company may be entitled to receive from any insurance maintained by M/s L-1 Identity Solutions Operating Company to cover such a liability, whichever of (A) or (B) is higher.

45.2 This limitation of liability shall not affect M/s L-1 Identity Solutions Operating Company liability, if any, for damage to Third Parties caused by M/s L-1 Identity Solutions Operating Company / Team of M/s L-1 Identity Solutions Operating Company or any person or firm/company acting on behalf of M/s L-1 Identity Solutions Operating Company in executing the work or in carrying out the Services.



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Solutions Operating Company undertake to continue to provide services at an offer which is mutually agreed upon by the purchaser (UIDAI or its representative) and the bidder.

#### 43. Penalty

43.1 Activities required to be performed by M/s L-1 Identity Solutions Operating Company in order to execute the Scope of work of this contract and ongoing performance and maintenance services along with the service levels shall be in line with the requirements of Purchaser and in accordance with the timelines, performance/service levels and targets as stipulated in the Contract and SLA, failing which M/s L-1 Identity Solutions Operating Company would be liable for a Penalty as defined under Annexure C (Service Level Agreement) to General Conditions of Contract.

#### 44. Insurance

44.1 The Goods supplied under this Contract shall be fully insured by M/s L-1 Identity Solutions Operating Company, against any loss or damage, till the Acceptance of the System, M/s L-1 Identity Solutions Operating Company shall submit to the Purchaser, documentary evidence issued by the insurance company, indicating that such insurance has been taken.

44.2 M/s L-1 Identity Solutions Operating Company shall bear all the statutory levies like customs, insurance, freight, etc. applicable on the goods during their shipment from respective manufacturing/shipment site of the OEM to the port of landing.

44.3 All charges like transportation charges, octroi, etc. that may be applicable till the goods are delivered at the respective site of installation shall also be borne by the bidder.

44.4 M/s L-1 Identity Solutions Operating Company during the term of this contract shall take out and maintain, at his own cost but on terms and conditions approved by UIDAI, insurance with financially sound and reputable insurers against the risks, and for the coverage, as specified below:

a. Insurance against loss of or damage to:-

- i. equipment or assets procured or developed in whole or in part for fulfillment of obligations under this Contract

B.B. Nanawati, ooc

Unique Identity of India Society of India  
Punjab Chamber of Commerce & Industry  
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### 39. Project In-charge

39.1 M/s L-1 Identity Solutions Operating Company shall ensure that at all times during the currency of the Contract a Project In-charge acceptable to the Purchaser shall take charge of the Performance of the Contract. Key Personnel required for execution of this contract have been provided under clause 12 of Annexure E – Scope of Work.

39.2 It is mandatory that the designated Project In-charge should not change till the acceptance of the system.

### 40. Completion of Contract

40.1 Unless terminated earlier, the Contract shall terminate on the completion of term as specified in the Contract and only after the obligations mentioned in Clause 24 are fulfilled to the satisfaction of the Purchaser.

### 41. Passing of Property


41.1 Ownership of goods that are part of this contract shall not pass to the Purchaser unless and until the system is accepted in accordance with the conditions of the contract and to the entire satisfaction of the Purchaser

41.2 M/s L-1 Identity Solutions Operating Company will be allowed to retain a lien on the goods supplied by him, for the unpaid amount of the cost of goods

### 42. No Assignment

42.1 M/s L-1 Identity Solutions Operating Company shall not transfer any interest, right, benefit or obligation under this Contract without the prior written consent of the Purchaser.

42.2 The purchaser reserves the right to assign this contract to a representative of UIDAI during the currency of the contract or extend and transfer this contract to the representative after the expiry of the current contract period. In the event of an assignment, obligations of M/s L-1 Identity Solutions Operating Company towards the purchaser under the contract will have to be fulfilled by the bidder and be accountable to the new assignee. In the event of transfer of contract to a representative at the end of the currency of this contract period, M/s L-1 Identity


  
D.S. Nanawati, DGS

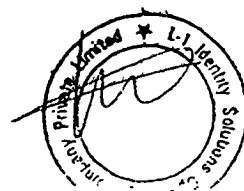
General Manager, IT, Government of India  
Ministry of Information and Public Relations  
Government of India

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- 38.3 M/s L-1 Identity Solutions Operating Company warrants that the Goods supplied under the Contract are new, non-refurbished, unused and recently manufactured; shall not be nearing End of sale / End of support; and shall be supported by M/s L-1 Identity Solutions Operating Company and respective OEM along with service and spares support to ensure its efficient and effective operation for the entire duration of the contract.
- 38.4 M/s L-1 Identity Solutions Operating Company warrants that the goods supplied under this contract shall be of the highest grade and quality and consisted with the established and generally accepted standards for materials of this type. The goods shall be in full conformity with the specifications and shall operate properly and safely. All recent design improvements in goods, unless provided otherwise in the Contract, shall also be made available.
- 38.5 M/s L-1 Identity Solutions Operating Company further warrants that the Goods supplied under this Contract shall be free from all encumbrances and defects/faults arising from design, material, manufacture or workmanship (except inssofar as the design or material is required by the Purchaser's Specifications) or from any act or omission of M/s L-1 Identity Solutions Operating Company, that may develop under normal use of the supplied Goods in the conditions prevailing at the respective Datacenter Sites and UIDAI Locations.
- 38.6 The Purchaser shall promptly notify M/s L-1 Identity Solutions Operating Company in writing of any claims arising under this warranty.
- 38.7 Upon receipt of such notice, M/s L-1 Identity Solutions Operating Company shall, with all reasonable speed, repair or replace the defective Goods or parts thereof, without prejudice to any other rights which the Purchaser may have against M/s L-1 Identity Solutions Operating Company under the Contract.
- 38.8 If M/s L-1 Identity Solutions Operating Company, having been notified, fails to remedy the defect(s) within a reasonable period, the Purchaser may proceed to take such remedial action as may be necessary, at the risk of M/s L-1 Identity Solutions Operating Company and expense and without prejudice to any other rights which the Purchaser may have against M/s L-1 Identity Solutions Operating Company under the Contract.

  
 B.D. Naraswami, son  
 of late B.D. Naraswami, deceased  
 Family Member of late B.D. Naraswami,  
 Committed to the service of the Nation



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### 35.8 Conditions for revised work / change order

35.8.1 The provisions of the Contract shall apply to revised work / change order as if the revised work / Change order has been included in the original Scope of Work. However, the Contract Value shall increase / decrease and the schedule shall be adjusted on account of the revised work / Change orders as may be mutually agreed in terms of provisions set forth in Clause 35. The obligations of M/s L-1 Identity Solutions Operating Company with respect to such revised work / change order shall remain in accordance with the Contract.

### 36. Governing Language

36.1 The Agreement shall be written in English and/or Hindi language. Subject to Clause 6 of Section II of the Bid Document, such language versions of the Agreement shall govern its interpretation. All correspondence and other documents pertaining to the Contract that are exchanged by parties shall be written in either English or Hindi language. In the event of a conflict between the two versions, English version shall prevail.


### 37. "No Claim" Certificate

37.1 M/s L-1 Identity Solutions Operating Company shall not be entitled to make any claim, whatsoever against the Purchaser, under or by virtue of or arising out of, this contract, nor shall the Purchaser entertain or consider any such claim, if made by M/s L-1 Identity Solutions Operating Company after he shall have signed a "No claim" certificate in favour of the Purchaser in such forms as shall be required by the Purchaser after the works are finally accepted.

### 38. Warranty

38.1 A comprehensive warranty applicable on all goods supplied under this contract shall be provided by the respective OEM for 5 (Five) calendar years from the date of acceptance of the entire system by the Purchaser.

38.2 Technical Support for Software/Algorithms shall be provided by the respective OEM for 5 (Five) calendar years from the date of acceptance of the entire system by the Purchaser. The Technical Support should include all upgrades, updates and patches to the respective Software for the above stated period.


  
B.B. Nandawati, **DDO**  
District Collector, District of Indore  
Indore, Madhya Pradesh - 462 001  
Contact No. 0731-2541111

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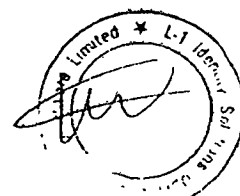
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- 35.7.7 The estimated cost and time impact indicated by M/s L-1 Identity Solutions Operating Company shall be considered as a ceiling limit and shall be provisionally considered for taking a decision to implement change order.
- 35.7.8 The time impact applicable to the Contract shall be mutually agreed, subsequently, on the basis of the detailed calculations supported with all relevant back up documents.
- 35.7.9 In case M/s L-1 Identity Solutions Operating Company fails to submit all necessary substantiation/calculations and back up documents, the decision of the Purchaser regarding time and cost impact shall be final and binding on M/s L-1 Identity Solutions Operating Company.
- 35.7.10 If Purchaser accepts the implementation of the change order under Clause 35.7.6 in writing, which would be considered as change order, then M/s L-1 Identity Solutions Operating Company shall commence to proceed with the enforcement of the change order pending final agreement between the parties with regard to adjustment of the Contract Value and the Schedule.
- 35.7.11 In case, mutual agreement under Clause 35.7.4 above, i.e. whether new requirement constitutes the change order or not, is not reached, then M/s L-1 Identity Solutions Operating Company in the interest of the works, shall take up the enforcement of the change order, if advised in writing to do so by Purchaser's Representative pending settlement between the two parties to the effect whether such requirement constitutes a change order or not as per the terms and conditions of Contract documents. The time and cost effects in such a case shall be mutually verified and recorded. Should it establish that the said work constitutes a change order, the same shall be compensated taking into account the records kept in accordance with the Contract.
- 35.7.12 M/s L-1 Identity Solutions Operating Company shall submit necessary back up documents for the change order showing the break-up of the various elements constituting the change order for the Purchaser's review. If no agreement is reached between the Purchaser and M/s L-1 Identity Solutions Operating Company within 60 days after Purchaser's instruction in writing to carry out the change concerning the increase or decrease in the Contract Value and all other matters described above, either party may refer the dispute to arbitration.

  
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Executive Director, Authority of India  
Planning Commission, New Delhi  
Contract No. 10/2011-12

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Value which shall represent the change in cost of the goods and/or works caused by the Variations. Any change order shall be duly approved by the Purchaser in writing.

- 35.6.5 If there is a difference of opinion between M/s L-1 Identity Solutions Operating Company and Purchaser's Representative on whether a particular item, work or part of the work constitutes a change order or not, the matter shall be handled in accordance with the procedures set forth in Clause 35.7.11.

#### 35.7 Procedures for Change Order

- 35.7.1 Upon receiving any revised requirement/advice, in writing, from the Purchaser, M/s L-1 Identity Solutions Operating Company would verbally discuss the matter with Purchaser's Representative.
- 35.7.2 In case such requirement arises from the side of M/s L-1 Identity Solutions Operating Company, he would also verbally discuss the matter with Purchaser's Representative giving reasons thereof.
- 35.7.3 In either of the two cases as explained in Clause 35.7.1 and Clause 35.7.2 above, the representatives of both the parties will discuss on the revised requirement for better understanding and to mutually decide whether such requirement constitutes a change order or not.
- 35.7.4 If it is mutually agreed that such Requirement constitutes a "Change Order" then a joint memorandum will be prepared and signed by M/s L-1 Identity Solutions Operating Company and Purchaser to confirm a "Change Order" and basic ideas of necessary agreed arrangement.
- 35.7.5 M/s L-1 Identity Solutions Operating Company will study the revised requirement in accordance with the joint memorandum under Clause 35.7.4 and assess subsequent schedule and cost effect, if any.
- 35.7.6 Upon completion of the study referred to above under Clause 35.7.5, the results of this study along with all relevant details including the estimated time and cost effect thereof with supporting documents would be submitted to the Purchaser to enable the Purchaser to give a final decision whether M/s L-1 Identity Solutions Operating Company should proceed with the change order or not in the best interest of the works.

  
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Chairman, Joint Committee for the  
Purchase of Commissioned and to be  
Commissioned for the L-1 Identity Solutions



time to be allowed for delivery/installation of such extra goods/equipment or for commencement of such services. In case of decrease in Quantities or Specifications of goods/equipment or Service requirements, M/s L-1 Identity Solutions Operating Company shall give a reduction in price at the rate given in the Contract corresponding to the said decrease.

- 35.5 In case applicable rates for the increase/decrease in question are not available in the Contract then the rates as may be mutually agreed shall apply. M/s L-1 Identity Solutions Operating Company shall not be entitled to any claim by way of change of price, damages, losses, etc. M/s L-1 Identity Solutions Operating Company shall be compensated at actual for any cancellation charges provided the claim is duly supported by documentary evidence of having incurred cancellation charges, which results from Purchaser's action in reducing/canceling Term of reference.

#### 35.6 Conditions for Change Order

- 35.6.1 The change order will be initiated only in case (i) the Purchaser directs in writing M/s L-1 Identity Solutions Operating Company to incorporate changes to the goods or design requirements already covered in the Contract. (ii) the Purchaser directs in writing to M/s L-1 Identity Solutions Operating Company to include any addition to the Scope of Work or services covered under this Contract or delete any part thereof, (iii) M/s L-1 Identity Solutions Operating Company requests to delete any part of the work which will not adversely affect the operational capabilities and functioning of the system and if the deletions proposed are agreed to by the Purchaser and for which cost and time benefits shall be passed on to the Purchaser,
- 35.6.2 Any change order comprising an alteration which involves change in the cost of the goods and/or services (which sort of alteration is hereinafter called a "Variation") shall be the Subject of an amendment to the Contract by way of an increase or decrease in the Contract Value and adjustment of the implementation schedule if any.
- 35.6.3 If the Contract provides applicable rates for the valuation of the variation in question the Contract Value shall subject to Clause 35.6.4 be increased or decreased in accordance with those rates.
- 35.6.4 If parties agree that the Contract does not contain applicable rates or that the said rates are inappropriate or the said rates are not precisely applicable to the variation in question, then the parties shall negotiate a revision of the Contract

B.B. Nanawati, DDO

Unique Identity of Authority of India  
Planning Committee - 10, J. P. Road, Prithvi,  
Company of India - 110001





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the Bid documents are minimum requirements and are in no way exhaustive and guaranteed by the Purchaser.

- 35.1.1 Any upward revision and/or additions consequent to errors, omissions, ambiguities, discrepancies in the quantities, specifications, drawings etc. of the Bid documents which M/s L-1 Identity Solutions Operating Company had not brought out to the Purchaser's notice till the time of award of work and not accounted for in his Bid shall not constitute a change order and such upward revisions and/or addition shall be carried out by M/s L-1 Identity Solutions Operating Company without any time and cost effect to Purchaser.
- 35.1.2 It shall be the responsibility of M/s L-1 Identity Solutions Operating Company to meet all performance and other requirements of the Purchaser as stipulated in the Bid document / Contract. Any upward revisions / additions of quantities, specifications, technical manpower, service requirements to those specified by M/s L-1 Identity Solutions Operating Company in his Bid documents, that may be required to be made during installation / commissioning of the System or at any time during the currency of the contract in order to meet the conceptual design, objective and performance levels or other requirements as defined in the Bid documents shall not constitute a change order and shall be carried out by M/s L-1 Identity Solutions Operating Company without any change order and without any time and cost effect to the Purchaser whatsoever.
- 35.2 The Purchaser may at any time, by a written change order given to M/s L-1 Identity Solutions Operating Company, make changes within the general scope of the Contract. The Purchaser will have the option to increase or decrease (decrease only if communicated to M/s L-1 Identity Solutions Operating Company prior to availing of services / dispatch of goods / equipments) the Quantities, Licenses and/or Specifications of the goods/equipment to be supplied and installed by M/s L-1 Identity Solutions Operating Company or service requirements, as mentioned in the Contract, at any time during the contract period.
- 35.3 The written advice to any change shall be issued by the Purchaser to M/s L-1 Identity Solutions Operating Company upto 4 (four) weeks prior to the due date of provisioning/supply of such goods/equipments or commencement of services.
- 35.4 In case of increase in Quantities/ Licenses / Specifications or Service requirements or in case of additional requirement, M/s L-1 Identity Solutions Operating Company agrees to carry out / provision for such additional requirement at the rate and terms and conditions as provided in the Contract except for the appropriate extension of

B.E. Nanawati, doc

Engineer in Charge, A. T. C. S. of India,  
The State of Maharashtra, Mumbai  
L-1 Identity Solutions, Ltd.



Any Party may change the address to which notices are to be directed to it by notice to the other parties in the manner specified above.

A notice served on a Representative is taken to be notice to that Representative's Party.

#### 30.8 Waiver

- a. Any waiver of any provision of this Contract is ineffective unless it is in writing and signed by the Party waiving its rights.
- b. A waiver by either Party in respect of a breach of a provision of this Contract by the other Party is not a waiver in respect of any other breach of that or any other provision.
- c. The failure of either Party to enforce at any time any of the provisions of this Contract shall not be interpreted as a waiver of such provision.

#### 31. Application

- 31.1 These General Conditions shall apply to the extent that provisions in other parts of the Contract do not supersede them.

#### 32. Performance Security

- 32.1 Within 15 days after the receipt of notification of award of the Contract / Purchase Order from the Purchaser, the successful bidder shall furnish Performance Security to the Purchaser, which shall be equal to 10% of the value of the Contract and shall be in the form of a Guarantee Bond from a Nationalised Bank in the Proforma given at Annexe 4.3.3 of Section IV of the Bid Document.

#### 33. Modification

- 33.1 Any modification of this Contract shall be in writing and signed by an authorized representative of each Party.

#### 34. Currency of Payment

- 34.1 Payment shall be made in Indian Rupees only.

#### 35. Change Orders/Alteration/Variation

- 35.1 M/s L-1 Identity Solutions Operating Company agrees that the System requirements/quantities/licenses/specifications and Service requirements given in

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B.B. Nanawati, ooo  
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 Planning Commission, Jawahar Bhawan  
 Connaught Circus, New Delhi 110001



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### 30.3 Entire Contract

The terms and conditions laid down in the Bid and all annexures, addendum thereto as also the Bid and any attachments/annexes thereto shall be read in consonance with and form an integral part of this Contract. This Contract supersedes any prior Contract, understanding or representation of the Parties on the subject matter.

### 30.4 Governing Law

This Contract shall be governed in accordance with the laws of India.

### 30.5 Jurisdiction of Courts

The courts of India at Delhi have exclusive jurisdiction to determine any proceeding in relation to this Contract.

### 30.6 Compliance with Laws

M/s L-1 Identity Solutions Operating Company / Team of M/s L-1 Identity Solutions Operating Company shall comply with the laws in force in India in the course of performing this Contract.

### 30.7 Notices

All notices, requests or consents provided for or permitted to be given under this Contract shall be in writing and shall be deemed effectively given when personally delivered or mailed by pre-paid certified/registered mail, return receipt requested, addressed as follows and shall be deemed received two days after mailing or on the date of delivery if personally delivered:

#### To Purchaser at:

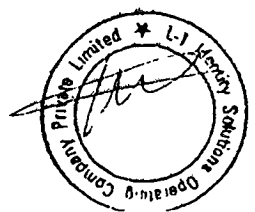
The Deputy Director General,  
Unique Identification Authority of India,  
Tower-2, 3<sup>rd</sup> Floor, Jeevan Bharati Building  
Connaught Circus, New Delhi - 110001  
[Phone:] +91 11 23753706

#### To M/s L-1 Identity Solutions Operating Company at:

L-1 Identity Solutions Operating Company  
c/o Biometrics Division  
5705 West Old Shakopee Road, Suite 100  
Bloomington, Minnesota 55437  
Attn: President  
[Phone:] (952) 932-0888  
[Fax:] (952) 932-7181

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Unique Identification Authority of India  
3rd Floor, Connaught Circus, New Delhi - 110001  
Connaught Circus, New Delhi - 110001



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stipulated safeguards the failure to perform obligations has occurred. In such an event, the affected party shall inform the other party in writing within five days of the occurrence of such event. The Purchaser will make the payments due for Services rendered till the occurrence of Force Majeure. However, any failure or lapse on the part of M/s L-1 Identity Solutions Operating Company / Team of M/s L-1 Identity Solutions Operating Company in performing any obligation as is necessary and proper, to negate the damage due to projected force majeure events or to mitigate the damage that may be caused due to the abovementioned events or the failure to provide adequate disaster management/recovery or any failure in setting up a contingency mechanism would not constitute force majeure, as set out above.

- 29.4 In case of a Force Majeure, all Parties will endeavor to agree on an alternate mode of performance in order to ensure the continuity of service and implementation of the obligations of a party under the Contract and to minimize any adverse consequences of Force Majeure.

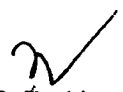
### 30. General

#### 30.1 Relationship between the Parties

- a. Nothing in this Contract constitutes any <sup>v</sup>fiduciary relationship between the Purchaser and M/s L-1 Identity Solutions Operating Company/Team of M/s L-1 Identity Solutions Operating Company or any relationship of employer employee, principal and agent, or partnership, between the Purchaser and M/s L-1 Identity Solutions Operating Company.
- b. No Party has any authority to bind the other Party in any manner whatsoever except as agreed under the terms of this Contract.
- c. The Purchaser has no obligations to the team of M/s L-1 Identity Solutions Operating Company except as agreed under the terms of this Contract.

#### 30.2 Survival

The provisions of the clauses of this Contract in relation to documents, data, processes, property, Intellectual Property Rights, indemnity, publicity and confidentiality and ownership survive the expiry or termination of this Contract and in relation to confidentiality, the obligations continue to apply unless the Purchaser notifies M/s L-1 Identity Solutions Operating Company of its release from those obligations.

  
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Group - Identity Solutions, India  
Corporate Governance, India  
Contract Management

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## 27. Conflict of interest

- ✓ 27.1 M/s L-1 Identity Solutions Operating Company shall disclose to the Purchaser in writing, all actual and potential conflicts of interest that exist, arise or may arise (either for M/s L-1 Identity Solutions Operating Company or the team of M/s L-1 Identity Solutions Operating Company) in the course of performing the Services as soon as practical after it becomes aware of that conflict.

## 28. Publicity

- 28.1 M/s L-1 Identity Solutions Operating Company / Team of M/s L-1 Identity Solutions Operating Company shall not make or permit to be made a public announcement or media release about any aspect of this Contract unless the Purchaser first gives M/s L-1 Identity Solutions Operating Company its written consent.

## 29. Force Majeure

- 29.1 Force Majeure shall not include any events caused due to acts/omissions of such Party or result from a breach/contravention of any of the terms of the Contract, Bid and/or the Bid. It shall also not include any default on the part of a Party due to its negligence or failure to implement the stipulated/proposed precautions, as were required to be taken under the Contract.
- 29.2 For Purposes of this Clause, "Force Majeure" means an event beyond the control of M/s L-1 Identity Solutions Operating Company and not involving M/s L-1 Identity Solutions Operating Company and not involving M/s L-1 Identity Solutions Operating Company's fault or negligence and not foreseeable. Such events may include, but are not restricted to, acts of the Purchaser either in its sovereign or contractual capacity, wars or revolutions, fires, floods, epidemics, quarantine restrictions and freight embargoes. If a force Majeure situation rises, M/s L-1 Identity Solutions Operating Company shall promptly notify the Purchaser in writing of such conditions and the cause thereof. Unless otherwise directed by the Purchaser in writing, M/s L-1 Identity Solutions Operating Company shall continue to perform its obligations under the Contract as far as is reasonably practical, and shall seek all reasonable alternative means for performance not prevented by the Force Majeure event.
- 29.3 The failure or occurrence of a delay in performance of any of the obligations of either party shall constitute a Force Majeure event only where such failure or delay could not have reasonably been foreseen, or where despite the presence of adequate and

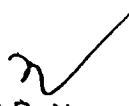
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Director, Department of Industries  
Government of India  
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- 25.8 If any of the Arbitrators so appointed dies, resigns, incapacitated or withdraws for any reason from the proceedings, it shall be lawful for the concerned party/ arbitrator to appoint another person in his place in the same manner as aforesaid. Such person shall proceed with the reference from the stage where his predecessor had left if both parties consent for the same, otherwise, he shall proceed de novo.
- 25.9 It is a Scope of the contract that the party invoking arbitration shall specify all disputes to be referred to arbitration at the time of invocation of arbitration and not thereafter.
- 25.10 It is also a Scope of the contract that neither party to the contract shall be entitled for any interest on the amount of the award.
- 25.11 The Arbitral Tribunal shall give reasoned award and the same shall be final, conclusive and binding on the parties.
- 25.12 The fees of the arbitrator shall be borne by the parties nominating them and the fee of the Presiding Arbitrator, costs and other expenses incidental to the arbitration proceedings shall be borne equally by the parties.
- 25.13 Subject to as aforesaid the provisions of the Arbitration and Conciliation Act, 1996 and any statutory modifications or re-enactment in lieu thereof shall apply to the arbitration proceedings under this clause.
- 25.14 Continuance of the Contract:
- 25.15 Notwithstanding the fact that settlement of dispute(s) (if any) under arbitration may be pending, the parties hereto shall continue to be governed by and perform the work in accordance with the provisions under this Contract.
26. Time is of the essence
- 26.1 Time shall be of the essence in respect of any date or period specified in this Contract or any notice, demand or other communication served under or pursuant to any provision of this Contract and in particular in respect of the completion of the activities by M/s L-1 Identity Solutions Operating Company by the specified completion date.

  
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Unique Identification Authority of India  
Planning Commission, New Delhi  
Connaught Place, New Delhi

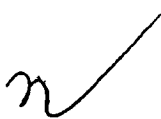
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## 25. Dispute Resolution ✓

- 25.1 If during the subsistence of this Contract or thereafter, any dispute between the Parties hereto arising out of or in connection with the validity, interpretation, implementation, material breach or any alleged material breach of any provision of this Contract or regarding any question, including as to whether the termination of this Contract by one Party hereto has been legitimate, the Parties hereto shall endeavor to settle such dispute amicably and/or by Conciliation to be governed by the Arbitration and Conciliation Act, 1996 or as may be agreed to between the Parties. The attempt to bring about an amicable settlement is considered to have failed as soon as one of the Parties hereto, after reasonable attempts; which attempt shall continue for not less than thirty (30) days, gives thirty (30) days notice to refer the dispute to arbitration to the other Party in writing.
- 25.2 The Arbitration proceedings shall be governed by the Indian Arbitration and Conciliation Act, 1996.
- ✓ 25.3 The Arbitration proceedings shall be held in Delhi, India. ✓
- 25.4 The Arbitration proceeding shall be governed by the substantive laws of India.
- 25.5 The proceedings of Arbitration shall be in English language.
- 25.6 Except as otherwise provided elsewhere in the contract if any dispute, difference, question or disagreement arises between the parties hereto or their respective representatives or assignees, at any time in connection with construction, meaning, operation, effect, interpretation or out of the contract or breach thereof the same shall be decided by an Arbitral Tribunal consisting of three Arbitrators. Each party shall appoint one Arbitrator and the Arbitrators so appointed shall appoint the third Arbitrator who will act as Presiding Arbitrator.
- 25.7 In case, a party fails to appoint an arbitrator within 30 days from the receipt of the request to do so by the other party or the two Arbitrators so appointed fail to agree on the appointment of third Arbitrator within 30 days from the date of their appointment upon request of a party, the Chief Justice of India or any person or institution designated by him (in case of International commercial Arbitration) shall appoint the Arbitrators/Presiding Arbitrator. In case of domestic contracts, the Chief Justice of the High Court or any person or institution designated by him within whose jurisdiction the subject purchase order/contract has been placed / made, shall appoint the arbitrator/Presiding Arbitrator upon request of one of the parties.

  
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that have been satisfactorily installed and commissioned and for that part of the Services which have been authorized by the Purchaser and satisfactorily performed by M/s L-1 Identity Solutions Operating Company up to the date of termination. Without prejudice any other rights, the Purchaser may retain such amounts from the payment due and payable by the Purchaser to M/s L-1 Identity Solutions Operating Company as may be required to offset any losses caused to the Purchaser as a result of the Termination or due to any act/omissions of M/s L-1 Identity Solutions Operating Company. In case of any loss or damage due to default on the part of M/s L-1 Identity Solutions Operating Company in performing any of its obligations with regard to executing the Scope of Work under this Contract, M/s L-1 Identity Solutions Operating Company shall compensate the Purchaser for any such loss, damages or other costs, incurred by the Purchaser. Additionally, the team of M/s L-1 Identity Solutions Operating Company and/or all third parties appointed by M/s L-1 Identity Solutions Operating Company shall continue to perform all their obligations and responsibilities as stipulated under this Contract, and as may be proper and necessary to execute the Scope of Work under the Contract in terms of Bid of M/s L-1 Identity Solutions Operating Company, the Bid and this Contract, in an identical manner as were being performed before the collapse of M/s L-1 Identity Solutions Operating Company as described above in order to execute an effective transition and to maintain business continuity. All third parties shall continue to perform all/any functions as stipulated by the UIDAI and as may be proper and necessary to execute the scope of work under the Contract in terms of the bid of M/s L-1 Identity Solutions Operating Company, the Tender and this Contract.

24.3 Nothing herein shall restrict the right of the Purchaser to invoke the Bank Guarantee and other Guarantees furnished hereunder, enforce the Deed of Indemnity and pursue such other rights and/or remedies that may be available to the Purchaser under law.

24.4 The termination hereof shall not affect any accrued right or liability of either Party nor affect the operation of the provisions of this Contract that are expressly or by implication intended to come into or continue in force on or after such termination.

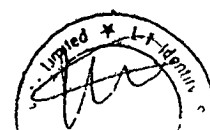
24.5 In the event of termination of this Contract due to any cause whatsoever, whether consequent to the stipulated Terms of the Contract or otherwise or, if this Contract is terminated prior to the completion of Services, the Biometric Service Provider shall transfer the ownership of the equipment and licenses thereon to operate in the existing infrastructure provided under this contract to Purchaser.



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Planning Commission, New Delhi  
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Purchaser a prior and written notice at least 12 months in advance indicating its intention to terminate the Contract.

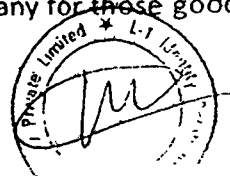
#### 24. Consequences of Termination

24.1 In the event of termination of this Contract pursuant to Clause 23, [whether consequent to the stipulated Term of the Contract or otherwise] the Purchaser shall be entitled to impose any such obligations and conditions and issue any clarifications as may be necessary to ensure an efficient transition and effective business continuity of the project which M/s L-1 Identity Solutions Operating Company shall be obliged to comply with and take all available steps to minimize loss resulting from that termination/breach, and further allow and provide all such assistance to the Purchaser and/or the successor agency, as may be required, to takeover the erstwhile obligations of the M/s L-1 Identity Solutions Operating Company in relation to the execution/continued execution of the scope of this Contract, even where such assistance is required to be rendered for a reasonable period that may extend beyond the contract term/ termination hereof.

24.2 In the event that the termination of this Contract is due to the expiry of the Term of this Contract / a decision not to grant any (further) extension by the UIDAI, or where the termination is prior to the expiry of the stipulated term due to the occurrence of any Event of Default on the part of M/s L-1 Identity Solutions Operating Company, M/s L-1 Identity Solutions Operating Company herein shall be obliged to provide all such assistance to the successor M/s L-1 Identity Solutions Operating Company or any other person as may be required and as the Purchaser may specify including training, where the successor(s) is a representative/personnel of the Purchaser to enable the successor to adequately provide the Services hereunder, even where such assistance is required to be rendered for a reasonable period that may extend beyond the Term/earlier termination hereof. Where the termination of the Contract is prior to its stipulated term on account of a Default on the part of M/s L-1 Identity Solutions Operating Company /Team of M/s L-1 Identity Solutions Operating Company or due to the fact that the survival of M/s L-1 Identity Solutions Operating Company as an independent corporate entity is threatened/has ceased, or for any other reason including termination for convenience pursuant to Clause 23.1(e), whatsoever, the Purchaser through re-determination of the consideration payable to M/s L-1 Identity Solutions Operating Company as agreed mutually by Purchaser and M/s L-1 Identity Solutions Operating Company or through a third party acceptable to both parties may pay M/s L-1 Identity Solutions Operating Company for those goods

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Unique Identity Solutions Private Limited  
 Planning Committee, 1st Floor, 1st Floor,  
 Connaught Place, New Delhi - 110028



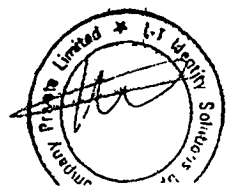
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- (b) Where it comes to the Purchaser's attention that M/s L-1 Identity Solutions Operating Company (or the team of M/s L-1 Identity Solutions Operating Company) is in a position of actual conflict of interest with the interests of the Purchaser, in relation to any of terms of Bid of M/s L-1 Identity Solutions Operating Company, the Bid or this Contract.
- (c) Where M/s L-1 Identity Solutions Operating Company / any of Consortium members of M/s L-1 Identity Solutions Operating Company ability to survive as an independent corporate entity is threatened or is lost owing to any reason whatsoever, including inter-alia the filing of any bankruptcy proceedings against M/s L-1 Identity Solutions Operating Company or its consortium members, any failure by M/s L-1 Identity Solutions Operating Company or its consortium member to pay any of its dues to its creditors, the institution of any winding up proceedings against M/s L-1 Identity Solutions Operating Company / Consortium member of M/s L-1 Identity Solutions Operating Company or the happening of any such events that are adverse to the commercial viability of M/s L-1 Identity Solutions Operating Company / Consortium member of M/s L-1 Identity Solutions Operating Company. In the event of the happening of any events of the above nature, the Purchaser shall reserve the right to take any steps as are necessary, to ensure the effective transition of the project to a successor agency, and to ensure business continuity
- (d) **Termination for Insolvency:** The Purchaser may at any time terminate the Contract by giving written notice to M/s L-1 Identity Solutions Operating Company, without compensation to M/s L-1 Identity Solutions Operating Company, if M/s L-1 Identity Solutions Operating Company / Consortium member of M/s L-1 Identity Solutions Operating Company become bankrupt or otherwise insolvent, provided that such termination will not prejudice or affect any right of action or remedy which has accrued or will accrue thereafter to the Purchaser.
- (e) **Termination for Convenience:** The Purchaser, may, by written notice sent to M/s L-1 Identity Solutions Operating Company, terminate the Contract, in whole or in part at any time for its convenience. The notice of termination shall specify that termination is for the Purchaser's convenience, the extent to which performance of work under the Contract is terminated, and the date upon which such termination becomes effective.

23.2 M/s L-1 Identity Solutions Operating Company may, subject to approval by the Purchaser, terminate this Contract before the expiry of the term by giving the

  
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Unique Identity Solutions, India  
Planning Commission, New Delhi  
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the imposition of such obligations as are laid down in the Delay and Deterrent Mechanism and/or levy of penalty as set (refer Clause 43) and/or termination of the Contract at the discretion of the Purchaser.

## 22. Term and Extension of the Contract

✓ 22.1 The term of this Contract shall be initially for a period of two (2) years or completion of 20 Crores enrollment transactions whichever is earlier from the date of the award of contract, according to the stipulated time schedules specified in Clause 21.

22.2 The Purchaser shall reserve the sole right to grant any extension to the term abovementioned and shall notify in writing to M/s L-1 Identity Solutions Operating Company, at least 6 months before the expiration of the Term hereof, whether it will grant M/s L-1 Identity Solutions Operating Company an extension of the Term. The decision to grant or refuse the extension shall be at the Purchaser's discretion and such extension of the contract, if any, shall be as per terms agreed mutually between the Purchaser and M/s L-1 Identity Solutions Operating Company.

22.3 Where the Purchaser is of the view that no further extension of the term be granted to M/s L-1 Identity Solutions Operating Company, the Purchaser shall notify M/s L-1 Identity Solutions Operating Company of its decision at least 6 (six) months prior to the expiry of the Term. Upon receipt of such notice, M/s L-1 Identity Solutions Operating Company shall continue to perform all its obligations hereunder, until such reasonable time beyond the Term of the Contract within which, the Purchaser shall either appoint an alternative agency/vendor or create its own infrastructure to operate such Services as are provided under this Contract.

## 23. Termination

23.1 The Purchaser may, terminate this Contract in whole or in part by giving M/s L-1 Identity Solutions Operating Company a prior and written notice indicating its intention to terminate the Contract under the following circumstances:

- (a) Where the Purchaser is of the opinion that there has been such Event of Default on the part of M/s L-1 Identity Solutions Operating Company / Team of M/s L-1 Identity Solutions Operating Company which would make it proper and necessary to terminate this Contract and may include failure on the part of M/s L-1 Identity Solutions Operating Company to respect any of its commitments with regard to any part of its obligations under its Bid, the Bid or under this Contract.



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S. N.	Milestone	Time for Completion
4.	<b>Go-live for 1 Crore enrolment</b> Activities leading to go-live shall include: <ol style="list-style-type: none"> <li>Installation, commissioning and Configuration of the hardware for the 1 Crore enrolments</li> <li>Setup of Test and Production Environment with a view to start the Biometrics Solution for 1 Crore enrolment</li> <li>Installation, commissioning and configuration of Biometric Solution in Test Environment</li> <li>System &amp; Integration Testing of the Solution</li> <li>Installation, commissioning and Configuration of Biometric Solution on hardware for 1 Crore enrolment in production environment (which is provisioned by the BSP)</li> <li>SDK API implementation</li> <li>SDK based verification (joint task of ASDMSA &amp; BSP)</li> <li>SDK based adjudication workstation (assistance by BSP)</li> <li>SDK based monitoring and analysis functional (assistance by BSP)</li> <li>Acceptance of the Solution</li> </ol>	T + 12 Weeks
5.	Commencement of adherence with SLA (SLA Activation)	T + 24 Weeks (G)
6.	<b>Overall Solution Warranty</b> -Warranty shall cover Software Patch update, upgrades, bug fixing and resolution of hardware and storage issues, backup.	G + 6 Months from SLA Activation

\* May be amended by the Purchaser from time to time.

21.2 The Biometrics Solution Provider shall perform the activities and comply in all respects with the critical dates and the parties hereby agree that failure on part of the Biometrics Solution Provider, and other Consortium Members to meet the critical dates without prejudice to any other rights that the Purchaser may have, may lead to



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S. N.	Milestone	Time for Completion
	<p>facilities in the datacenter</p> <p>f. Set up the required Test and Production environments for the rollout of PoC. The hardware used for Solution Demonstration exercise as part of the RFP evaluation process could be used for the rollout of PoC, if found adequate to meet the requirements based on expected enrolment transactions.</p> <p>g. Begin to supply SDK perpetual licenses of the proposed multimodal SDK to cater to requirements as stated in sub-section 4. Solution Components</p> <p>h. Support ASDMSA in developing the client enrolment software through provisioning licensing, training and services. While M/s L-1 Identity Solutions Operating Company may utilize commercially reasonable copy protection means for the SDK, the SDK must not use hardware license key or keyed to ID (such as CPU, serial number, Ethernet ID) in a manner that unreasonably interferes with the Purchaser's licensed use of the SDK for its intended purpose. That is transparent to the software development, testing, installation and deployment; that is unfettered and transparent to the end user's use of the SDK developed application.</p>	
2.	<p>a. Setup of Test and Production Environment with a view to start the Proof of Concept for Biometrics Solution</p> <p>b. SDK integration with client enrolment software</p>	T+ 1 Week
3.	Go-live of solution as Proof of Concept	T+2 Weeks

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Operating Company all losses/ or other damages that may have resulted from such failure.

## 20.5 Terminate the Contract in part or in full

20.5.1 Retain such amounts from the payment due and payable by the Purchaser to M/s L-1 Identity Solutions Operating Company as may be required to offset any losses caused to the Purchaser as a result of such event of default and M/s L-1 Identity Solutions Operating Company shall compensate the Purchaser for any such loss, damages or other costs, incurred by the Purchaser in this regard. Nothing herein shall effect the continued obligation of M/s L-1 Identity Solutions Operating Company and Team of M/s L-1 Identity Solutions Operating Company to perform all their obligations and responsibilities under this Contract in an identical manner as were being performed before the occurrence of the default.

20.5.2 Invoke the Performance Bank Guarantee and other Guarantees furnished hereunder, enforce the Deed of Indemnity, recover such other costs/losses and other amounts from M/s L-1 Identity Solutions Operating Company as may have resulted from such default and pursue such other rights and/or remedies that may be available to the Purchaser under law.

## 21. Stipulated Time Schedule

21.1 The key milestone dates ("critical dates")\* as anticipated by the Purchaser are

S. N.	Milestone	Time for Completion
1.	a. Mobilization of Team b. Commencement of supply of hardware for 1 Cröre enrolment c. Conduct a kick-off meeting with UIDAI with participation from key personnel proposed for the project to discuss the project plan for way forward d. Submission of plan for procurement, transportation, installation and commissioning of hardware in pilot data center e. Co-ordinate with Data Center service provider and prepare a blue print for deployment of hardware, ensure availability of power and other environmental	T + 1 Week

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setting out specific defaults / deviances / omissions / non-compliances / non-performances and providing a notice of to enable such defaulting party to remedy the default committed.

- ✓ 19.3 Where despite the issuance of a default notice to M/s L-1 Identity Solutions Operating Company by the Purchaser M/s L-1 Identity Solutions Operating Company fails to remedy the default to the satisfaction of M/s L-1 Identity Solutions Operating Company, the Purchaser may, where it deems fit, issue to the defaulting party another default notice or proceed to adopt such remedies as may be available to the Purchaser.

## 20. Consequences of Event of Default

20.1 Where an Event of Default subsists or remains uncured the Purchaser shall be entitled to:

20.2 Impose any such obligations and conditions and issue any clarifications as may be necessary to inter alia ensure smooth continuation of project and the Services which M/s L-1 Identity Solutions Operating Company shall be obliged to comply with which may include re-determination of the consideration payable to M/s L-1 Identity Solutions Operating Company as agreed mutually by Purchaser and M/s L-1 Identity Solutions Operating Company or through a third party acceptable to both parties. M/s L-1 Identity Solutions Operating Company shall in addition take all available steps to minimize loss resulting from such event of default.

- 20.3 Suspend all payments to M/s L-1 Identity Solutions Operating Company under the Contract by a written notice of suspension to M/s L-1 Identity Solutions Operating Company, provided that such notice of suspension:

- i. shall specify the nature of the failure; and
- ii. shall request M/s L-1 Identity Solutions Operating Company to remedy such failure within a specified period from the date of receipt of such notice of suspension by M/s L-1 Identity Solutions Operating Company.

20.4 Require replacement of any of the Consortium Member(s) / Team member(s) of M/s L-1 Identity Solutions Operating Company with another suitable member(s) where the Purchaser deems necessary. M/s L-1 Identity Solutions Operating Company shall in such case terminate forthwith all their agreements/ contracts/ other arrangements with such member(s) and find suitable replacement for such outgoing member(s) with another member(s) to the satisfaction of the Purchaser, who shall execute such Contracts with the Purchaser as the Purchaser may require. Failure on the part of M/s L-1 Identity Solutions Operating Company to find a suitable replacement and/or terminate all agreements/contracts with such member(s), shall amount to a breach of the terms hereof and the Purchaser in addition to all other rights, have the right to claim damages and recover from M/s L-1 Identity Solutions

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- b. M/s L-1 Identity Solutions Operating Company/ Team of M/s L-1 Identity Solutions Operating Company has failed to confirm/ adhere to any of the key performance indicators as laid down in the Key Performance Measures / Service Level Agreements, or if M/s L-1 Identity Solutions Operating Company has fallen short of matching such standards / benchmarks / targets as the Purchaser may have designated with respect to the system or any goods, task or service, necessary for the execution of the Scope of Work and performance of services under this Contract. The above mentioned failure on the part of M/s L-1 Identity Solutions Operating Company may be in terms of failure to adhere to performance, quality, timelines, specifications, requirements or any other criteria as defined by the Purchaser;
- c. M/s L-1 Identity Solutions Operating Company has failed to remedy a defect or failure to perform its obligations in accordance with the specifications issued by the Purchaser, despite being served with a default notice which laid down the specific deviance on the part of M/s L-1 Identity Solutions Operating Company/ Team of M/s L-1 Identity Solutions Operating Company to comply with any stipulations or standards as laid down by the Purchaser; or
- d. M/s L-1 Identity Solutions Operating Company/ Team of M/s L-1 Identity Solutions Operating Company has failed to adhere to any amended direction, instruction, modification or clarification as issued by the Purchaser during the term of this Contract and which the Purchaser deems proper and necessary for the execution of the Scope of Work under this Contract
- e. M/s L-1 Identity Solutions Operating Company/ Team of M/s L-1 Identity Solutions Operating Company has failed to demonstrate or sustain any representation or warranty made by it in this Contract, with respect to any of the terms of its Bid, the Bid and this Contract
- f. There is a proceeding for bankruptcy, insolvency, winding up or there is an appointment of receiver, liquidator, assignee, or similar official against or in relation to M/s L-1 Identity Solutions Operating Company.
- g. M/s L-1 Identity Solutions Operating Company/Team of M/s L-1 Identity Solutions Operating Company has failed to comply with or is in breach or contravention of any applicable laws.

19.2 Where there has been an occurrence of such defaults inter alia as stated above, the Purchaser shall issue a notice of default to M/s L-1 Identity Solutions Operating Company,

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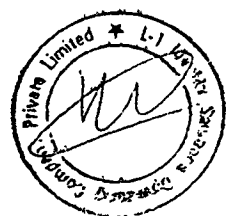
- 18.4 M/s L-1 Identity Solutions Operating Company shall do everything reasonably possible to preserve the confidentiality of the Confidential Information including execution of a confidentiality agreement with the consortium members and other members of Team of M/s L-1 Identity Solutions Operating Company to the satisfaction of the Purchaser.
- 18.5 M/s L-1 Identity Solutions Operating Company shall notify the Purchaser promptly if it is aware of any disclosure of the Confidential Information otherwise than as permitted by this Contract or with the authority of the Purchaser.
- 18.6 M/s L-1 Identity Solutions Operating Company shall do everything reasonably possible to preserve the confidentiality of the Confidential Information including execution of a confidentiality agreement with the consortium members and other members of Team of M/s L-1 Identity Solutions Operating Company to the satisfaction of the Purchaser.
- 18.7 M/s L-1 Identity Solutions Operating Company shall notify the Purchaser promptly if it is aware of any disclosure of the Confidential Information otherwise than as permitted by this Contract or with the authority of the Purchaser.
- 18.8 M/s L-1 Identity Solutions Operating Company shall be liable to fully recompense the Purchaser for any loss of revenue arising from breach of confidentiality. The Purchaser reserves the right to adopt legal proceedings, civil or criminal, against M/s L-1 Identity Solutions Operating Company / Team of M/s L-1 Identity Solutions Operating Company in relation to a dispute arising out of breach of obligation by M/s L-1 Identity Solutions Operating Company under this clause.
- 18.9 M/s L-1 Identity Solutions Operating Company and all members of the consortium shall execute a Annexure H - Non Disclosure Agreement (NDA), individually, in favour of the Purchaser.

**19. Events of Default by M/s L-1 Identity Solutions Operating Company**

- 19.1 The failure on the part of M/s L-1 Identity Solutions Operating Company to perform any of its obligations or comply with any of the terms of this Contract shall constitute an Event of Default on the part of M/s L-1 Identity Solutions Operating Company. The events of default as mentioned above may include inter-alia the following:
- a. M/s L-1 Identity Solutions Operating Company/ Team of M/s L-1 Identity Solutions Operating Company has failed to perform any instructions or directives issued by the Purchaser which it deems proper and necessary to execute the Scope of Work or provide services under the Contract, or

  
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data, architecture schematics, designs, storage media and other information / documents without the prior written consent of the Purchaser.

18.3 M/s L-1 Identity Solutions Operating Company may only disclose Confidential Information in the following circumstances:

- i. with the prior written consent of the Purchaser;
- ii. to a member of the team of M/s L-1 Identity Solutions Operating Company if:
  - A. the member of the team of M/s L-1 Identity Solutions Operating Company needs the Confidential Information for the performance of obligations under this contract;
  - B. the member of the team of M/s L-1 Identity Solutions Operating Company is aware of the confidentiality of the Confidential Information and is obliged to use it only for the performance of obligations under this contract

to disclose  
a. to the US Govt

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advancement in technology, shortcomings of the system and any changes required for improving the overall efficiency of the system.

- (r) That M/s L-1 Identity Solutions Operating Company shall provide adequate and appropriate support and participation, on a continuing basis, in tuning all supplied hardware and software to meet the requirements of the applications.
- (s) If and when the system and/or components of the system are required to be relocated / shifted within the same Datacenter Site or to a new Datacenter Site, M/s L-1 Identity Solutions Operating Company shall undertake required work related for de-commissioning / re-commissioning and other associated work, at no additional cost to the Purchaser. Associated cost for transportation, insurance and packing shall however be borne by the Purchaser. For any such relocation / shifting efforts beyond two such occurrences during the contract period, extra charges shall be mutually agreed upon.

## 18. Confidentiality

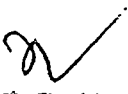
18.1 M/s L-1 Identity Solutions Operating Company / Team of M/s L-1 Identity Solutions Operating Company shall not use Confidential Information, the name or the logo of the Purchaser except for the purposes of execution of this contract.

Confidential information does not include information which:

- i. M/s L-1 Identity Solutions Operating Company / Team of M/s L-1 Identity Solutions Operating Company knew or had in its possession, prior to disclosure, without limitation on its confidentiality;
- ii. is independently developed by M/s L-1 Identity Solutions Operating Company / Team of M/s L-1 Identity Solutions Operating Company without breach of conditions under this Contract;
- iii. information in the public domain as a matter of law;
- iv. is received from a third party not subject to the obligation of confidentiality with respect to such information;
- v. is released from confidentiality with the written consent of UIDAI.

M/s L-1 Identity Solutions Operating Company / Team of M/s L-1 Identity Solutions Operating Company shall have the burden of proving hereinabove are applicable to the information in the possession of M/s L-1 Identity Solutions Operating Company / Team of M/s L-1 Identity Solutions Operating Company.

18.2 M/s L-1 Identity Solutions Operating Company / Team of M/s L-1 Identity Solutions Operating Company shall not, either during the term or after expiration of this Contract, disclose any proprietary or confidential information relating to the Services/Contract and/or Purchaser's business/ operations, information, Application/software, hardware, business

  
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Planning Commission, New Delhi  
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- (m) That M/s L-1 Identity Solutions Operating Company confirms that there has not and shall not occur any execution, amendment or modification of any agreement/contract without the prior written consent of the Purchaser, which may directly or indirectly have a bearing on the Contract or the project.
- (n) That M/s L-1 Identity Solutions Operating Company owns or has good, legal or beneficial title, or other interest in, to the property, assets and revenues of M/s L-1 Identity Solutions Operating Company on which it grants or purports to grant or create any interest pursuant to the Contract, in each case free and clear of any encumbrance and further confirms that such interests created or expressed to be created are valid and enforceable.
- (o) That M/s L-1 Identity Solutions Operating Company owns, has license to use or otherwise has the right to use, free of any pending or threatened liens or other security or other interests all Intellectual Property Rights, which are required or desirable for the performance of the project under this contract and regarding the same M/s L-1 Identity Solutions Operating Company does not, so far as M/s L-1 Identity Solutions Operating Company is aware, in carrying on its business and operations, infringe any Intellectual Property Rights of any person. So far as M/s L-1 Identity Solutions Operating Company is aware, none of the Intellectual Property Rights owned or enjoyed by M/s L-1 Identity Solutions Operating Company or which M/s L-1 Identity Solutions Operating Company is licensed to use, which are material in the context of the business of M/s L-1 Identity Solutions Operating Company and operations for the performance of this contract are being infringed nor, so far as M/s L-1 Identity Solutions Operating Company is aware, is there any infringement or threatened infringement of those Intellectual Property Rights licensed or provided to M/s L-1 Identity Solutions Operating Company by any person. All Intellectual Property Rights (owned by M/s L-1 Identity Solutions Operating Company or which M/s L-1 Identity Solutions Operating Company is licensed to use) required by M/s L-1 Identity Solutions Operating Company for the performance of the contract are valid and subsisting. All actions (including registration, payment of all registration and renewal fees) required to maintain the same in full force and effect have been taken thereon and shall keep the Purchaser indemnified in relation thereto. The remedy for any breach of this clause shall be the indemnity set forth in Clause 13.3 for Intellectual Property Rights.
- (p) *This clause (18.1.p) is intentionally left blank.*
- (q) That M/s L-1 Identity Solutions Operating Company agrees to incorporate, within the contract value, all hardware configuration, software changes, upgrades and patches to the system, announced by him from time to time keeping in view the



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- (f) That M/s L-1 Identity Solutions Operating Company /The team of M/s L-1 Identity Solutions Operating Company shall use such assets of the Purchaser as the Purchaser may permit for the sole purpose of execution of its obligations under the terms of the Bid, Bid or this Contract. M/s L-1 Identity Solutions Operating Company shall however, have no claim to any right, title, lien or other interest in any such property, and any possession of property for any duration whatsoever shall not create any right in equity or otherwise, merely by fact of such use or possession during or after the term hereof.
- (g) That M/s L-1 Identity Solutions Operating Company shall procure all the necessary permissions and adequate approvals and licenses for use of various software and any copyrighted process/product free from all claims, titles, interests and liens thereon and shall keep the Purchaser indemnified in relation thereto.
- (h) That the execution of the Scope of Work and the Services herein is and shall be in accordance and in compliance with all applicable laws.
- (i) That M/s L-1 Identity Solutions Operating Company has the corporate power to execute, deliver and perform the terms and provisions of this Contract and has taken all necessary corporate action to authorise the execution, delivery and performance by it of the Contract.
- (j) That all conditions precedent under the Contract have been satisfied.
- (k) That neither the execution and delivery by M/s L-1 Identity Solutions Operating Company /Team of M/s L-1 Identity Solutions Operating Company of the Contract nor the compliance with or performance of M/s L-1 Identity Solutions Operating Company /compliance with or performance of Team of M/s L-1 Identity Solutions Operating Company, of the terms and provisions of the Contract (i) will contravene any provision of any Applicable Law or any order, writ, injunction or decree of any court or Governmental Authority binding on M/s L-1 Identity Solutions Operating Company, (ii) will conflict or be inconsistent with or result in any breach of any or the terms, covenants, conditions or provisions of, or constitute a default under any agreement, contract or instrument to which M/s L-1 Identity Solutions Operating Company is a party or by which it or any of its property or assets is bound or to which it may be subject or (iii) will violate any provision of the Memorandum and Articles of Association of M/s L-1 Identity Solutions Operating Company.
- (l) That M/s L-1 Identity Solutions Operating Company certifies that all registrations, recordings, filings and notarisations of the Contract and all payments of any tax or duty, including but not limited to stamp duty, registration charges or similar amounts which are required to be effected or made by M/s L-1 Identity Solutions Operating Company which is necessary to ensure the legality, validity, enforceability or admissibility in evidence of the Contract have been made.

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16.2 M/s L-1 Identity Solutions Operating Company shall also indemnify the Purchaser against any privilege, claim or assertion made by a third party with respect to right or interest in, ownership, mortgage or disposal of any asset, property, movable or immovable as mentioned in any Intellectual Property Rights, licenses and permits.

## 17. Representations and Warranties

17.1 In order to induce the Purchaser to enter into this Contract, M/s L-1 Identity Solutions Operating Company hereby represents and warrants as of the date hereof, which representations and warranties shall survive the term and termination hereof, the following:

- (a) That the selected M/s L-1 Identity Solutions Operating Company along with its consortium members have the power and the authority that would be required to enter into this Contract and the requisite experience, the technical know-how and the financial wherewithal required to successfully execute the terms of this contract and to provide services sought by the Purchaser under this contract
- (b) That M/s L-1 Identity Solutions Operating Company and its Consortiums Members are not involved in any major litigation or legal proceedings, pending, existing, potential or threatened, that may have an impact of affecting or compromising the performance or delivery of Services under this Contract.
- (c) That the representations and warranties made by M/s L-1 Identity Solutions Operating Company in the Contract are and shall continue to remain true and correct throughout the term of this Contract and M/s L-1 Identity Solutions Operating Company shall fulfill all the requirements as are necessary for executing the obligations and responsibilities as laid down in the Contract and the Bid and unless the Purchaser specifies to the contrary, M/s L-1 Identity Solutions Operating Company shall be bound by all the terms of the Bid.
- (d) That M/s L-1 Identity Solutions Operating Company and its team has the professional skills, personnel, infrastructure and resources/authorizations that are necessary for providing all such services as are necessary to fulfill the Scope of Work stipulated in the Bid and this Contract.
- (e) That M/s L-1 Identity Solutions Operating Company shall ensure that all assets/ components including but not limited to equipment, software, licenses, processes, documents, etc. installed, developed, procured, deployed and created during the term of this Contract are duly maintained and suitably updated, upgraded, replaced with regards to contemporary requirements.



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or The team of M/s L-1 Identity Solutions Operating Company in the course of performing the Services under this Contract.

15.2 The Purchaser shall have the sole ownership of and the right of use, proprietary Biometric templates of residents of India as created and maintained by M/s L-1 Identity Solutions Operating Company in the course of performing the Services under this Contract. In the event of termination or expiry of contract, M/s L-1 Identity Solutions Operating Company shall transfer all the proprietary templates to UIDAI in an electronic storage media in a form that is freely retrievable for reference and usage in future.

15.3 The Data shall be retained by M/s L-1 Identity Solutions Operating Company not more than a period of 7 years as per Retention Policy of Government of India or any other policy that UIDAI may adopt in future.

## 16. Indemnity

16.1 M/s L-1 Identity Solutions Operating Company shall execute and furnish to the Purchaser, a Deed of Indemnity in favour of the Purchaser in a form and manner acceptable to the Purchaser, indemnifying the Purchaser from and against any costs, loss, damages, expense, claims including those from third parties or liabilities of any kind howsoever suffered, arising or incurred inter alia during and after the Contract period out of:

- a. any negligence or wrongful act or omission by M/s L-1 Identity Solutions Operating Company or the team of M/s L-1 Identity Solutions Operating Company or any third party associated with M/s L-1 Identity Solutions Operating Company in connection with or incidental to this Contract; or
- b. any breach of any of the terms of the bid of M/s L-1 Identity Solutions Operating Company as agreed, the Bid and this Contract by M/s L-1 Identity Solutions Operating Company, the team of M/s L-1 Identity Solutions Operating Company or any third party.
- c. any infringement of patent, trademark/copyright or industrial design rights arising from the use of the supplied goods and related services or any part thereof.

13.5 Records of Contract Documents:

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13.5.1 M/s L-1 Identity Solutions Operating Company shall at all time make and keep sufficient copies of the Contract documents, manuals, reference material, drawings, specifications and any other document required by him to fulfill his duties under the Contract.

13.5.2 M/s L-1 Identity Solutions Operating Company shall keep at each Datacenter Site and UIDAI Location, adequate number of copies of all documents required to fulfill his duties under the Contract, in excess of his own requirement and those copies shall be available at all times for use by the Purchaser's Representative and/or by any other person authorized by the Purchaser's Representative.

14. Ownership and Retention of Documents


14.1 The Purchaser shall own the Documents, proposed by or for M/s L-1 Identity Solutions Operating Company arising out of or in connection with this Contract.

14.2 The Documents shall be retained by M/s L-1 Identity Solutions Operating Company not more than a period of 7 years as per Retention Policy of Government of India or any other policy that UIDAI may adopt in future.

14.3 Forthwith upon expiry or earlier termination of this Contract and at any other time on demand by the Purchaser, M/s L-1 Identity Solutions Operating Company shall deliver to the Purchaser all Documents provided by or originating from the Purchaser and all Documents produced by or from or for M/s L-1 Identity Solutions Operating Company in the course of performing the Services, unless otherwise directed in writing by the Purchaser at no additional cost. M/s L-1 Identity Solutions Operating Company shall not, without the prior written consent of the Purchaser store, copy, distribute or retain any such Documents.

15. Data and Hardware

15.1 By virtue of this Contract, M/s L-1 Identity Solutions Operating Company / The team of M/s L-1 Identity Solutions Operating Company may have access to personal information of the Purchaser and/or a third party or any resident of India, any other person covered within the ambit of any legislation as may be applicable. The Purchaser shall have the sole ownership of and the right to use, all such data in perpetuity including any data or other information pertaining to the residents of India that may be in the possession of M/s L-1 Identity Solutions Operating Company


  
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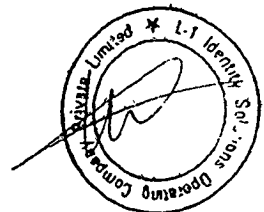


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- 13.4.4 M/s L-1 Identity Solutions Operating Company and The team of M/s L-1 Identity Solutions Operating Company shall follow Purchaser's Information Security policy. Access to Purchaser's data and systems, Email and Internet facility by M/s L-1 Identity Solutions Operating Company / the team of M/s L-1 Identity Solutions Operating Company at any of the Datacenter Site or UIDAI Location shall be in accordance with the security and access policies set by the Purchaser.
- 13.4.5 M/s L-1 Identity Solutions Operating Company and The team of M/s L-1 Identity Solutions Operating Company acknowledge that Purchaser's business data and other Purchaser proprietary information or materials, whether developed by Purchaser or being used by Purchaser pursuant to a license agreement with a third party (the foregoing collectively referred to herein as "proprietary information") are confidential and proprietary to Purchaser; and M/s L-1 Identity Solutions Operating Company along with its team agrees to use reasonable care to safeguard the proprietary information and to prevent the unauthorized use or disclosure thereof, which care shall not be less than that used by M/s L-1 Identity Solutions Operating Company to protect its own proprietary information. M/s L-1 Identity Solutions Operating Company recognizes that the goodwill of Purchaser depends, among other things, upon M/s L-1 Identity Solutions Operating Company keeping such proprietary information confidential and that unauthorized disclosure of the same by M/s L-1 Identity Solutions Operating Company or its team could damage the goodwill of Purchaser, and that by reason of duties of M/s L-1 Identity Solutions Operating Company hereunder. M/s L-1 Identity Solutions Operating Company may come into possession of such proprietary information, even though M/s L-1 Identity Solutions Operating Company does not take any direct part in or furnish the services performed for the creation of said proprietary information and shall limit access thereto to employees with a need to such access to perform the services required by this agreement. M/s L-1 Identity Solutions Operating Company shall use such information only for the purpose of performing the said services.
- 13.4.6 M/s L-1 Identity Solutions Operating Company shall, upon termination of this agreement for any reason, or upon demand by Purchaser, whichever is earliest, return any and all information provided to M/s L-1 Identity Solutions Operating Company by Purchaser, including any copies or reproductions, both hardcopy and electronic.

  
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Unique Identification Authority of India  
Public and Computer Services Division  
Computer Centre, New Delhi 110011

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Purchaser, prior to termination of this Contract and which may be assigned by the Purchaser to M/s L-1 Identity Solutions Operating Company for the purpose of execution of any of its obligations under the terms of the Bid, Bid or this Contract. However, subsequent to the term of this Contract, such approvals, registrations, licenses, permits and rights etc. shall endure to the exclusive benefit of the Purchaser

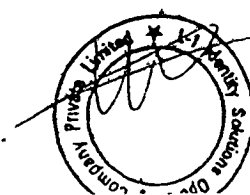
13.3 M/s L-1 Identity Solutions Operating Company / The team of M/s L-1 Identity Solutions Operating Company shall ensure that while it uses any software, hardware, processes, document or material in the course of performing the Services, it does not infringe the Intellectual Property Rights of any person and M/s L-1 Identity Solutions Operating Company shall keep the Purchaser indemnified against all costs, expenses and liabilities howsoever, arising out any illegal or unauthorized use (piracy) or in connection with any claim or proceedings relating to any breach or violation of any permission/license terms or infringement of any Intellectual Property Rights by M/s L-1 Identity Solutions Operating Company or the team of M/s L-1 Identity Solutions Operating Company during the course of performance of the Services. In case of any infringement by M/s L-1 Identity Solutions Operating Company / The team of M/s L-1 Identity Solutions Operating Company, M/s L-1 Identity Solutions Operating Company shall have sole control of the defense and all related settlement negotiations.

#### 13.4 Information Security

13.4.1 M/s L-1 Identity Solutions Operating Company / The team of M/s L-1 Identity Solutions Operating Company shall not carry any written/printed document, layout diagrams, floppy diskettes, hard disk, storage tapes, other storage devices or any other goods /material proprietary to Purchaser into / out of Datacenter Sites and UIDAI Locations without written permission from the Purchaser.

13.4.2 M/s L-1 Identity Solutions Operating Company / The team of M/s L-1 Identity Solutions Operating Company shall not destroy any unwanted documents, defective tapes/media present at the Datacenter Sites or UIDAI Locations on their own. All such documents, tapes/media shall be handed over to the Purchaser.

13.4.3 All documentation and media at the respective Datacenter Sites shall be properly identified, labeled and numbered by M/s L-1 Identity Solutions Operating Company. M/s L-1 Identity Solutions Operating Company shall keep track of all such items and provide a summary report of these items to the Purchaser on a monthly basis.



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### 13. Intellectual Property Rights

9 11 13.1 Purchaser shall own and have a right in perpetuity to use all original, newly created processes, products, specifications, reports, drawings and other documents and Intellectual Property Rights therein which have been identified by M/s L-1 Identity Solutions Operating Company to Purchaser as newly developed solely during execution of this Contract to the Purchaser's unique specifications and which do not contain any pre-existing Intellectual Property Rights (including any M/s L-1 Identity Solutions Operating Company's proprietary algorithms) belonging to M/s L-1 Identity Solutions Operating Company, or its consortium members. M/s L-1 Identity Solutions Operating Company undertakes to disclose all such Intellectual Property Rights arising in performance of the Services to the Purchaser and execute all such agreements/documents and file all relevant applications, effect transfers and obtain all permits and approvals that may be necessary in this regard to effectively transfer and conserve the Intellectual Property Rights of the Purchaser. M/s L-1 Identity Solutions Operating Company and its consortium members shall retain proprietary ownership of all Intellectual Property Rights in and to those Goods, Services and other deliverables to the Purchaser under the Contract that are modifications or derivative works to their pre-existing technologies, software, goods, services and other works. To the extent that a modification or derivative work made by L-1 Identity Solutions Operating Company or its consortium members contains unique confidential information of Purchaser, then L-1 Identity Solutions Operating Company and its consortium members shall not further license or distribute such modification or derivative work to any other customer or third party other than the Purchaser without the Purchaser's prior written permission. The Contract and the licenses granted herein are not a sale of a copy of the software and do not render Purchaser the owner of M/s L-1 Identity Solutions Operating Company's proprietary ABIS and SDK software. The software (Goods) delivered hereunder, which includes L-1 Identity Solutions Operating Company's proprietary software (containing proprietary algorithms) is licensed to the Purchaser in accordance with the express terms of L-1 Identity Solutions Operating Company's licensing policy in its Technical Bid.

13.2 If Purchaser desires, further, M/s L-1 Identity Solutions Operating Company shall be obliged to ensure that all approvals, registrations, licenses, permits and rights etc. which are inter-alia necessary for use of the goods supplied / installed by M/s L-1 Identity Solutions Operating Company, the same shall be acquired in the name of the

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Purchaser such information, as it may be required in regard to details of payment made to M/s L-1 Identity Solutions Operating Company by the Purchaser under the Contract for proper assessment of taxes and duties. The amount of tax withheld by the Purchaser shall at all times be in accordance with Indian Tax Law and the Purchaser shall promptly furnish to M/s L-1 Identity Solutions Operating Company original certificates (Challans) for tax deduction at source and paid to the Tax Authorities.

- 12.9.3 If there is any upward or downward revision in taxes / duties due to any reason whatsoever, after Notification of Award, the same shall be passed on to the appropriate party.
- 12.9.4 M/s L-1 Identity Solutions Operating Company agrees that he and his Team shall comply with the Indian Income Tax act in force from time to time and pay Indian Income Tax, as may be imposed / levied on them by the Indian Income Tax Authorities, for the payments received by them for the works under the Contract.
- 12.9.5 Should M/s L-1 Identity Solutions Operating Company fail to submit returns/pay taxes in times as stipulated under the Indian Income Tax Act and consequently any interest or penalty is imposed by the Indian Income Tax authority, M/s L-1 Identity Solutions Operating Company shall pay the same. M/s L-1 Identity Solutions Operating Company shall indemnify Purchaser against any and all liabilities or claims arising out of this Contract for such taxes including interest and penalty any such Tax Authority may assess or levy against the Purchaser/M/s L-1 Identity Solutions Operating Company.
- 12.9.6 The Purchaser shall if so required by applicable laws in force, at the time of payment, deduct income tax payable by M/s L-1 Identity Solutions Operating Company at the rates in force, from the amount due to M/s L-1 Identity Solutions Operating Company and pay to the concerned tax authority directly.

  
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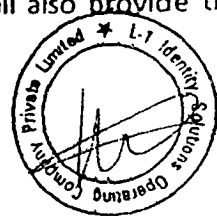
any payment falling due to M/s L-1 Identity Solutions Operating Company. The details of such recovery, if any, will be intimated to M/s L-1 Identity Solutions Operating Company. M/s L-1 Identity Solutions Operating Company shall receive the payment of undisputed amount under subsequent invoice for any amount that has been omitted in previous invoice by mistake on the part of the Purchaser or M/s L-1 Identity Solutions Operating Company.

#### 12.8 Deductions:

- 12.8.1 All payments to M/s L-1 Identity Solutions Operating Company shall be subject to the deductions of tax at source under Income Tax Act, and other taxes, and deductions as provided for under any law, rule or regulation. All costs, damages or expenses which Purchaser may have paid or incurred, for which under the provisions of the Contract, M/s L-1 Identity Solutions Operating Company is liable, the same shall be deducted by Purchaser from any dues to M/s L-1 Identity Solutions Operating Company. All payments to M/s L-1 Identity Solutions Operating Company shall be made after making necessary deductions as per terms of the Contract and recoveries towards facilities, if any, provided by the Purchaser to M/s L-1 Identity Solutions Operating Company on chargeable basis.

#### 12.9 Duties, Taxes and Statutory levies.

- 12.9.1 M/s L-1 Identity Solutions Operating Company shall bear all personnel taxes levied or imposed on its personnel, Vendors, consultants, or any other member of The team of M/s L-1 Identity Solutions Operating Company, etc. on account of payment received under this Contract. M/s L-1 Identity Solutions Operating Company shall bear all corporate taxes, levied or imposed on M/s L-1 Identity Solutions Operating Company on account of payments received by it from the Purchaser for the work done under this Contract.
- 12.9.2 M/s L-1 Identity Solutions Operating Company shall bear all taxes and duties etc. levied or imposed on M/s L-1 Identity Solutions Operating Company under the Contract including but not limited to Sales Tax, Customs duty, Excise duty, Octroi, Service Tax, VAT, Works Contracts Tax and all Income Tax levied under Indian Income Tax Act - 1961 or any amendment thereof upto the date for submission of final price bid, i.e., on account of payments received by him from the Purchaser for work done under the Contract. It shall be the responsibility of M/s L-1 Identity Solutions Operating Company to submit to the concerned Indian authorities the returns and all other connected documents required for this purpose. M/s L-1 Identity Solutions Operating Company shall also provide the



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to make any payments or for any other related obligation under this contract to any other party including but not limited to the consortium members/ vendors of M/s L-1 Identity Solutions Operating Company or any other member of The team of M/s L-1 Identity Solutions Operating Company or any third party engaged by M/s L-1 Identity Solutions Operating Company in any way connected with the discharge of the obligation of M/s L-1 Identity Solutions Operating Company under the Contract and in any manner whatsoever. M/s L-1 Identity Solutions Operating Company shall be fully liable and responsible for meeting all such obligations and all payments to be made to the aforesaid entities/parties.

- 12.3 All payments agreed to be made by Purchaser to M/s L-1 Identity Solutions Operating Company in accordance with the Contract shall be inclusive of all statutory levies, duties, taxes and other charges whenever levied/applicable including costs of maintenance, if any and Purchaser shall not be liable to pay any such levies/other charges under or in relation to this Contract and/or the Services.
- 12.4 Payment shall be paid at the times and in the manner set out in the Payment schedule as specified under to Clause 46 against value of contract. However, Service Tax shall be reimbursed against submission of payment proofs. Works contract taxes, if any applicable, shall be reimbursed against actual and against submission of payment proofs.
- 12.5 In case of change in taxes under change in law, appropriate parties shall be passed the benefit of the same over and above the contract value. In case of such change, M/s L-1 Identity Solutions Operating Company shall submit a formal request with necessary supporting documents to the Purchaser. The Purchaser shall verify these documents and if applicable and approved in writing by the Purchaser, M/s L-1 Identity Solutions Operating Company shall incorporate such changes into subsequent regular invoice for payment.
- 12.6 No invoice for extra work/change order on account of change order will be submitted by M/s L-1 Identity Solutions Operating Company unless the said extra work /change order has been authorized/approved by the Purchaser in writing in accordance with Clause 35.
- 12.7 In the event of Purchaser noticing at any time that any amount has been disbursed wrongly to M/s L-1 Identity Solutions Operating Company or any other amount is due from M/s L-1 Identity Solutions Operating Company to the Purchaser, the Purchaser may without prejudice to its rights recover such amounts by other means after notifying M/s L-1 Identity Solutions Operating Company or deduct such amount from



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## 11. Purchaser's Obligations

- 11.1 UIDAI shall act as the nodal point for implementation of the contract and for issuing necessary instructions, approvals, commissioning, acceptance certificates, payments etc. to M/s L-1 Identity Solutions Operating Company.
- 11.2 Purchaser shall ensure that timely approval is provided to M/s L-1 Identity Solutions Operating Company as and when required, which may include approval of project plans, implementation methodology, design documents, specifications, or any other document necessary in fulfillment of this contract.
- 11.3 The Purchaser shall approve all such documents within 15 working days.
- 11.4 The Purchaser's Representative shall interface with M/s L-1 Identity Solutions Operating Company, to provide the required information, clarifications, and to resolve any issues as may arise during the execution of the Contract. Purchaser shall provide adequate cooperation in providing details, coordinating and obtaining of approvals from various governmental agencies, in cases, where the intervention of the Purchaser is proper and necessary.
- 11.5 The Purchaser may provide on request of M/s L-1 Identity Solutions Operating Company, particulars/information/ or documentation that may be required by M/s L-1 Identity Solutions Operating Company for proper planning and execution of work and for providing services covered under this contract and for which M/s L-1 Identity Solutions Operating Company may have to coordinate with respective vendors.
- 11.6 Purchaser shall provide to M/s L-1 Identity Solutions Operating Company, sitting space and infrastructure (utilities, telephone lines) at Datacenter Sites and UIDAI Location as decided by the Purchaser.

## 12. Payments

- 12.1 Purchaser shall make payments only to M/s L-1 Identity Solutions Operating Company (Prime Consortium Member) at the times and in the manner set out in the Clause 46 - Payment subject to the fulfillment by M/s L-1 Identity Solutions Operating Company of the obligations herein. Purchaser will make all efforts to make payments to M/s L-1 Identity Solutions Operating Company within 30 days of receipt of invoice(s) along with all necessary supporting documents.
- 12.2 Purchaser shall make all payments under this Contract, as set out in the Payment clause to M/s L-1 Identity Solutions Operating Company only and shall not be liable

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Planning Commission, New Delhi, India  
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#### 10. Contract administration

10.1 No variation or modification of the terms of the contract shall be made except by written amendment signed by the parties.

10.2 Either party may appoint any individual / organization as their authorized representative through a written notice to the other party. Each Representative shall have the authority to:

- a. exercise all of the powers and functions of his/her Party under this Contract other than the power to amend this Contract and ensure the proper administration and performance of the terms hereof; and
- b. bind his or her Party in relation to any matter arising out of or in connection with this Contract.

10.3 M/s L-1 Identity Solutions Operating Company along with the members of Consortium /third parties shall be bound by all undertakings and representations made by the authorized representative of M/s L-1 Identity Solutions Operating Company and any covenants stipulated hereunder, with respect to this Contract, for and on their behalf.

10.4 For the purpose of execution or performance of the obligations under this Contract, the Purchaser's representative would act as an interface with the nominated representative of M/s L-1 Identity Solutions Operating Company. M/s L-1 Identity Solutions Operating Company shall comply with any instructions that are given by the Purchaser's representative during the course of this Contract in relation to the performance of its obligations under the terms of this Contract.



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9.12.11 M/s L-1 Identity Solutions Operating Company shall promptly replace every person removed, pursuant to this section, with a competent substitute, and at no extra cost to the Purchaser.

**9.13 Adherence to safety procedures, rules regulations and restriction**

9.13.1 The team of M/s L-1 Identity Solutions Operating Company shall comply with the provision of all laws including labour laws, rules, regulations and notifications issued there under from time to time. All safety and labour laws enforced by statutory agencies and by Purchaser shall be applicable in the performance of this Contract and The team of M/s L-1 Identity Solutions Operating Company shall abide by these laws.


9.13.2 Access to the Datacenter Sites and UIDAI Locations shall be strictly restricted. No access to any person except the essential members of the team of M/s L-1 Identity Solutions Operating Company who are genuinely required for execution of work or for carrying out management/maintenance who have been explicitly authorised by the Purchaser shall be allowed entry to the Datacenter Sites and UIDAI Locations. Even if allowed, access shall be restricted to the pertaining equipment of the Purchaser only. M/s L-1 Identity Solutions Operating Company shall maintain a log of all activities carried out by each of its team personnel.

9.13.3 M/s L-1 Identity Solutions Operating Company shall take all measures necessary or proper to protect the personnel, work and facilities and shall observe all reasonable safety rules and instructions. The team of M/s L-1 Identity Solutions Operating Company shall adhere to all security requirement/regulations of the Purchaser during the execution of the work. Purchaser's employee shall also comply with safety procedures/policy.

9.13.4 M/s L-1 Identity Solutions Operating Company shall report as soon as possible any evidence, which may indicate or is likely to lead to an abnormal or dangerous situation and shall take all necessary emergency control steps to avoid such abnormal situations.

**9.14 Statutory Requirements:**


9.14.1 During the tenure of this Contract nothing shall be done by M/s L-1 Identity Solutions Operating Company or his team in contravention of any law, act and/or rules/regulations, thereunder or any amendment thereof governing inter-alia customs, stowaways, foreign exchange and any other laws as applicable and shall keep Purchaser indemnified in this regard.

  
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Unique Identification Authority of India  
Planning Commission, Jawahar Bhawan,  
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- 9.12.7 M/s L-1 Identity Solutions Operating Company shall provide and deploy, at the Datacenter Site or UIDAI Location for carrying out the work, only those manpower resources who are qualified/skilled and experienced in their respective trades and who are competent to deliver in a proper and timely manner the work they are required to perform or to manage/supervise the work.
- 9.12.8 The Purchaser's Representative may at any time object to and require M/s L-1 Identity Solutions Operating Company to remove forthwith from the Datacenter Site or UIDAI Location any authorized representative or employee of M/s L-1 Identity Solutions Operating Company or any person(s) of the team of M/s L-1 Identity Solutions Operating Company, if, in the opinion of the Purchaser's Representative the person in question has mis-conducted or his / her deployment is otherwise considered undesirable by the Purchaser's Representative. M/s L-1 Identity Solutions Operating Company shall forthwith remove and shall not again deploy the person without the written consent of the Purchaser's Representative.
- 9.12.9 The Purchaser's Representative may at any time object to and request M/s L-1 Identity Solutions Operating Company to remove from the Datacenter Site or UIDAI Location any of authorized representative of M/s L-1 Identity Solutions Operating Company including any employee of M/s L-1 Identity Solutions Operating Company or his team or any person(s) deployed by M/s L-1 Identity Solutions Operating Company or his team for professional incompetence or negligence or for being deployed for work for which he is not suited. M/s L-1 Identity Solutions Operating Company shall consider the Purchaser's Representative request and may accede to or disregard it. The Purchaser's Representative, having made a request, as aforesaid in the case of any person, which M/s L-1 Identity Solutions Operating Company has disregarded, may in the case of the same person at any time but on a different occasion, and for a different instance of one of the reasons referred to above in this Clause object to and require M/s L-1 Identity Solutions Operating Company to remove that person from deployment on the work, which M/s L-1 Identity Solutions Operating Company shall then forthwith do and shall not again deploy any person so objected to on the work or on the sort of work in question (as the case may be) without the written consent of the Purchaser's Representative.
- 9.12.10 The Purchaser's Representative shall state to M/s L-1 Identity Solutions Operating Company in writing his reasons for any request or requirement pursuant to this clause.

  
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Identity Solutions Operating Company for execution of the work including the identities and Curriculum-Vitae of the key personnel to be deployed. M/s L-1 Identity Solutions Operating Company shall promptly inform the Purchaser, in writing, of any revision or alteration of such organization charts.

9.12.2 M/s L-1 Identity Solutions Operating Company should to the best of his efforts, avoid any change in the organization structure proposed for execution of this contract or replacement of any manpower resource appointed at the Datacenter Sites and UIDAI Locations. If the same is however unavoidable, due to circumstances such as the resource leaving the organization of M/s L-1 Identity Solutions Operating Company, M/s L-1 Identity Solutions Operating Company shall promptly inform the Purchaser in writing, and the same shall require subsequent approval by the Purchaser.

9.12.3 In case of replacement of any manpower resource, M/s L-1 Identity Solutions Operating Company should ensure efficient knowledge transfer from the outgoing resource to the incoming resource and adequate hand-holding period and training for the incoming resource in order to maintain the continued level of service.

9.12.4 All manpower resources deployed by M/s L-1 Identity Solutions Operating Company for execution of this contract must strictly adhere to the attendance reporting procedures and make their services available for the entire reporting time period at respective Datacenter Sites, UIDAI Locations or any location designated by the Purchaser.

9.12.5 M/s L-1 Identity Solutions Operating Company shall provide at the respective Datacenter site necessary supervision during the execution of work and as long thereafter as the Purchaser may consider necessary for the proper fulfillment of the obligations of M/s L-1 Identity Solutions Operating Company under the Contract. M/s L-1 Identity Solutions Operating Company or his competent and authorized representative(s) shall be constantly present at the respective Datacenter Site whole time for supervision. M/s L-1 Identity Solutions Operating Company shall authorize his representative to receive directions and instructions from the Purchaser's Representative.

9.12.6 M/s L-1 Identity Solutions Operating Company shall be responsible for the deployment, transportation, accommodation and other requirements of all its employees required for the execution of the work and provision of services for all costs/charges in connection thereof.

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access, etc. and in general to have obtained itself all necessary information of all risks, contingencies and circumstances affecting his obligations and responsibilities therewith under the Contract and his ability to perform it. However, if during pre-installation survey / during delivery or installation, M/s L-1 Identity Solutions Operating Company detects physical conditions and/or obstructions affecting the work, M/s L-1 Identity Solutions Operating Company shall take all measures to overcome them.

#### 9.11 Project Charter

9.11.1 After the release of Purchase Order under this Contract or prior to kick-off meeting whichever is earlier, M/s L-1 Identity Solutions Operating Company shall submit to the Purchaser for its approval, a detailed Project Charter showing the sequence, procedure and method in which he proposes to carry out the works as stipulated under Clause 9.12 of Annexure E – Scope of Work as per the this contract and shall, whenever reasonably required by the Purchaser's Representative furnish in writing the arrangements and methods proposed to be made for carrying out the works. The Project Charter so submitted by M/s L-1 Identity Solutions Operating Company shall conform to the requirements and timelines specified in the Contract. The Purchaser and M/s L-1 Identity Solutions Operating Company shall discuss and agree upon the work procedures to be followed for effective execution of the works, which M/s L-1 Identity Solutions Operating Company intends to deploy and shall be clearly specified. Approval by the Purchaser's Representative of a Project Charter shall not relieve M/s L-1 Identity Solutions Operating Company of any of his duties or responsibilities under the Contract.

9.11.2 However, if the work plans of M/s L-1 Identity Solutions Operating Company necessitate a disruption/ shutdown in Purchaser's operation, the plan shall be mutually discussed and developed so as to keep such disruption/shutdown to the barest unavoidable minimum. Any time and cost effect arising due to failure of M/s L-1 Identity Solutions Operating Company to develop/adhere such a work plan shall be to his account.

#### 9.12 Project Organisation of M/s L-1 Identity Solutions Operating Company

9.12.1 M/s L-1 Identity Solutions Operating Company shall supply to the Purchaser for its approval, within 5 calendar days after the release of Purchase Order under this Contract or prior to the kick-off meeting whichever is earlier, an organization chart showing the proposed organization/manpower to be established by M/s L-1

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completion of the works by the stipulated time, or is in deviation to Bid requirements/ standards, the Purchaser's representative shall so notify M/s L-1 Identity Solutions Operating Company in writing.

9.9.12 M/s L-1 Identity Solutions Operating Company shall reply to the written notice giving details of the measures he proposes to take to expedite the progress so as to complete the works by the prescribed time or to ensure compliance to Contract requirements. M/s L-1 Identity Solutions Operating Company shall not be entitled to any additional payment for taking such steps. If at any time, should it appear to the Purchaser or Purchaser's representative that the actual progress of work does not conform to the approved programme, M/s L-1 Identity Solutions Operating Company shall produce at the request of the Purchaser's representative a revised programme showing the modification to the approved programme necessary to ensure completion of the works within the time for completion or steps initiated to ensure compliance to the stipulated requirements

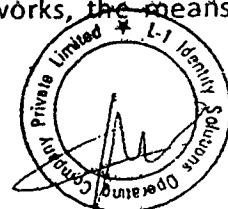
9.9.13 The submission seeking approval of the Purchaser or Purchaser's representative of such programme shall not relieve M/s L-1 Identity Solutions Operating Company of any of his duties or responsibilities under the Contract.

9.9.14 In case during execution of works, the progress falls behind schedule or does not meet the Contract requirements, M/s L-1 Identity Solutions Operating Company shall deploy extra manpower/ resources to make up the progress or to meet the Contract requirements. Programme for deployment of extra man power/ resources shall be submitted to the Purchaser for its review and approval, which approval shall not be unreasonably withheld. All time and cost effect in this respect shall be borne, by M/s L-1 Identity Solutions Operating Company within the contract value.


#### 9.10 Knowledge of Datacenter Site conditions

9.10.1 M/s L-1 Identity Solutions Operating Company shall be granted access to the Datacenter Sites for inspection by the Purchaser before commencement of installation. The plan shall be drawn mutually at a later stage.

9.10.2 M/s L-1 Identity Solutions Operating Company shall be deemed to have knowledge of the Datacenter Site and its surroundings and information available in connection therewith and to have satisfied itself the form and nature thereof including, the physical and climatic conditions, the quantities and nature of the works and materials necessary for the completion of the works, the means of



- 9.9.5 Periodic meetings shall be held between the representatives of the Purchaser and M/s L-1 Identity Solutions Operating Company once in every 15 days during the implementation phase to discuss the progress of implementation. After the implementation phase is over, the meeting shall be held on an ongoing basis, once in every 30 days to discuss the performance of the contract.
- 9.9.6 M/s L-1 Identity Solutions Operating Company shall ensure that the respective solution teams involved in the execution of work are part of such meetings.
- 9.9.7 A high level **Steering Committee** involving representatives of the Purchaser and senior officials of M/s L-1 Identity Solutions Operating Company (including the Managing Director, Country Head and Operational Head) shall be formed for the purpose of this contract. This committee shall meet at intervals, as decided by the Purchaser later, to oversee the progress of the project.
- 9.9.8 All the goods, services and manpower to be provided / deployed by M/s L-1 Identity Solutions Operating Company under the Contract and the manner and speed of execution and maintenance of the work and services are to be conducted in a manner to the satisfaction of Purchaser's representative in accordance with the Contract.
- 9.9.9 The Purchaser reserves the right to inspect and monitor/assess the progress/performance of the work / services at any time during the course of the Contract. The Purchaser may demand and upon such demand being made, M/s L-1 Identity Solutions Operating Company shall provide documents, data, material or any other information which the Purchaser may require, to enable it to assess the progress/performance of the work / service.
- 9.9.10 At any time during the course of the Contract, the Purchaser shall also have the right to conduct, either itself or through another agency as it may deem fit, an audit to monitor the performance by M/s L-1 Identity Solutions Operating Company of its obligations/functions in accordance with the standards committed to or required by the Purchaser and M/s L-1 Identity Solutions Operating Company undertakes to cooperate with and provide to the Purchaser/ any other agency appointed by the Purchaser, all Documents and other details as may be required by them for this purpose. Such audit shall not include books of accounts of M/s L-1 Identity Solutions Operating Company.
- 9.9.11 Should the rate of progress of the works or any part of them at any time fall behind the stipulated time for completion or is found to be too slow to ensure

  
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## 9.8 Start of Installation

9.8.1 Before commencement of installation at respective Datacenter Sites, M/s L-1 Identity Solutions Operating Company shall carry out proper planning and co-ordination with other vendors viz, Datacentre Service Provider and Application Software Development, Maintenance Support (ASDMSA) Agency and others as relevant in order to prepare the installation plan and detailed design documents. (Refer to Clause 10.2 and 10.3 of Annexure E for details)

9.8.2 The plan and design documents thus developed shall be submitted by M/s L-1 Identity Solutions Operating Company to the Purchaser for approval.

9.8.3 After obtaining the approval from the Purchaser, M/s L-1 Identity Solutions Operating Company shall commence the installation.

9.8.4 Prior to taking up installation of any major component of work, M/s L-1 Identity Solutions Operating Company shall submit to Purchaser the proposed procedures and obtain Purchaser's approval in writing.


## 9.9 Reporting Progress

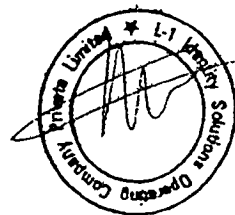
9.9.1 M/s L-1 Identity Solutions Operating Company shall monitor progress of all the activities related to the execution of this contract and shall submit to the Purchaser, at no extra cost, progress reports with reference to all related work, milestones and their progress during the implementation phase on a weekly basis.

9.9.2 Post implementation, M/s L-1 Identity Solutions Operating Company shall submit to the Purchaser, MIS reports on an ongoing basis. An indicative list of such reports along with their periodicity are mentioned in Clause 10.9.4 'MIS Reports' under Annexure E - Scope of Work.

9.9.3 The above reports mentioned under Clause 9.9.1 and Clause 9.9.2 are required to be submitted in 2 hard copies along with 2 soft copies. Extracts of these reports to be termed, as "Executive Summary" shall also be submitted in 2 copies, both in hard and soft format.

9.9.4 Formats for all abovementioned reports and their dissemination mechanism shall be discussed and finalized at the Kick-Off meeting. The Purchaser on mutual agreement between both parties may change the formats, periodicity and dissemination mechanism for such reports.

  
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Unique Identity System Architect, India  
Planning Committee, Ministry of Home Affairs,  
Connaught Place, New Delhi-110028



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the Purchaser's Representative for the proper coordination and timely completion of the works and on any other matters pertaining to the works. He will extend full co-operation to Purchaser's representative in the manner required by them for supervision/inspection/observation of the equipment/goods/ material, procedures, performance, progress, reports and records pertaining to the good/ services. He shall also have complete charge of the personnel of M/s L-1 Identity Solutions Operating Company engaged in the performance of the services and to ensure compliance of rules, regulations and safety practice. He shall also cooperate with the other Service Providers/Vendors of the Purchaser working at the Datacenter Sites and UIDAI Locations. Such representative(s) of M/s L-1 Identity Solutions Operating Company shall be available to the Purchaser's Representative at respective Datacenter Site and UIDAI location during the execution of Scope of Work under this Contract.

9.6 M/s L-1 Identity Solutions Operating Company shall be responsible, on an ongoing basis for coordination with other vendors and agencies of the Purchaser in order to resolve issues and oversee implementation of the same. M/s L-1 Identity Solutions Operating Company shall also be responsible for resolving conflicts between vendors in case of borderline integration issues.

#### 9.7 Access to Installation Sites

9.7.1 The Purchaser's representative upon receipt of request from M/s L-1 Identity Solutions Operating Company intimating commencement of installation at Datacenter Site shall give to M/s L-1 Identity Solutions Operating Company access to the Datacenter Site as may be necessary to enable M/s L-1 Identity Solutions Operating Company to commence and proceed with the installation of the works in accordance with the programme of work. Any such request as specified above shall have the prior approval of UIDAI. Any reasonable proposal of M/s L-1 Identity Solutions Operating Company for access to Site to proceed with the installation of work in accordance with the programme of work will be considered for approval and shall not be unreasonably withheld by the Purchaser. Such requests shall be made to the Purchaser's representative in writing at least 7 days prior to start of the work.

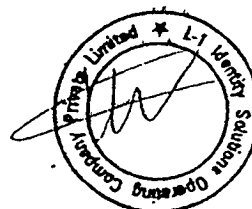
9.7.2 At the respective UIDAI Location, the Purchaser's representative shall give to M/s L-1 Identity Solutions Operating Company access to the UIDAI Location as may be necessary to enable M/s L-1 Identity Solutions Operating Company to commence and proceed with the installation of the works in accordance with the programme of work.



B.B. Nanawati, CEO

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Planning Commission, Jeevan Bhawan  
Connaught Circus, New Delhi-110001

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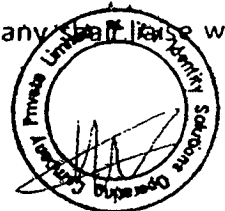


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Consortium member of M/s L-1 Identity Solutions Operating Company and must be declared at the time of bidding.

**9. Obligations of M/s L-1 Identity Solutions Operating Company**

- 9.1 The obligations of M/s L-1 Identity Solutions Operating Company shall include Design, Supply and Implementation of Biometric Matching Services, for UIDAI, as per the Scope of Work/ Contract and changes thereof to enable the UIDAI to meet the objectives and operational requirements. It shall be the responsibility of M/s L-1 Identity Solutions Operating Company to ensure the proper and successful implementation, performance and continued operation of the proposed solution in accordance with and in strict adherence to the terms of this Contract.
- 9.2 M/s L-1 Identity Solutions Operating Company shall be responsible to the Purchaser for meeting all obligations of the consortium for executing the Scope of Work and meeting all obligations of this bid. M/s L-1 Identity Solutions Operating Company shall also be the sole point of contact for all matters relating to this Contract.
- 9.3 M/s L-1 Identity Solutions Operating Company shall ensure that the team of M/s L-1 Identity Solutions Operating Company is competent, professional and possesses the requisite qualifications and experience appropriate to the task they are required to perform under this Contract. M/s L-1 Identity Solutions Operating Company shall ensure that the Services are performed through the efforts of the team of M/s L-1 Identity Solutions Operating Company, in accordance with the terms hereof and to the satisfaction of the Purchaser. Nothing in this Contract relieves M/s L-1 Identity Solutions Operating Company from its liabilities or obligations under this Contract to provide the Services in accordance with the Purchaser's directions and requirements and as stated in this Contract and the Bid to the extent accepted by the Purchaser and M/s L-1 Identity Solutions Operating Company shall be liable for any non-performance, non-compliance, breach or other loss and damage resulting either directly or indirectly by or on account of its Team.
- 9.4 M/s L-1 Identity Solutions Operating Company shall arrange at respective Datacenter Sites and UIDAI Locations, at no extra cost to the Purchaser, desktops, printers, stationary, tools, equipment, etc. that may be required by his team during the contract period for performance of Services under this contract.
- 9.5 The representative(s) of M/s L-1 Identity Solutions Operating Company shall have all the power requisite for and performance of services under this contract. Representative(s) of M/s L-1 Identity Solutions Operating Company shall liaise with



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- 7.2 The Consortium members agree that the Prime Consortium Member shall be the prime point of contact between the Consortium members and the Purchaser and shall be primarily responsible for the discharge and administration of all the obligations contained herein and, the Purchaser, unless it deems necessary shall deal only with the Prime Consortium Member.
- 7.3 The Purchaser reserves the right to review, approve and require amendment of the terms of the Consortium Contract or any contract or agreements entered into by and between the members of such Consortium and no such agreement/contract shall be executed, amended, modified and/or terminated without the prior written consent of the Purchaser. An executed copy of each of such agreements/contracts shall, immediately upon execution be submitted by M/s L-1 Identity Solutions Operating Company to the Purchaser.
- 7.4 In case of a breach of any of the terms hereof, unless the Purchaser decides otherwise, the each member of the Consortium including the Prime Bidder shall have liability individually to the extent of the 'Scope of Work', the proceedings for which are accrued by the consortium members respectively.. A notice of at least 2 months in advance is required to be given by the Prime Consortium Member to the Purchaser if during the terms of this Contract, the Prime Consortium Member desires to terminate any contract/arrangement relating to the performance of Services hereunder with any member of his Consortium.
- 7.5 Where, during the terms of this Contract, the Prime Consortium Member terminates any contract/arrangement or agreement relating to the performance of Services hereunder with a member of the Consortium (subject to approval by the Purchaser), the Prime Consortium Member shall be severally liable for all consequences resulting from such termination.. The Prime Consortium Member shall in such case ensure the smooth continuation of Services by providing a suitable replacement subject to approval and to the satisfaction of the Purchaser at no additional charge and at the earliest opportunity.

8. Sub – Contract

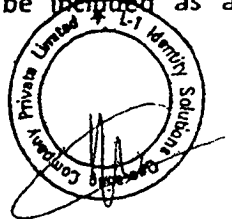
The Prime Consortium Member shall not be permitted to appoint any delegate/subcontractor for the performance of required services under this contract

In case any part of the work / services under this contract is required to be assigned by Prime Consortium Member to a third party, the same should be included as a

B.B. Nanawati, DDC

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- 6.2 M/s L-1 Identity Solutions Operating Company shall proceed to carry out the activities / services with diligence and expedition in accordance with any stipulation as to the time, manner, mode, and method of execution contained in this Contract.
- 6.3 The <sup>✓</sup>Prime Consortium Member shall be responsible for and shall ensure that all activities / services are performed in accordance with the Contract, Scope of Work and Service Specifications and that the team of M/s L-1 Identity Solutions Operating Company complies with such Specifications and all other standards, Terms and other stipulations/conditions set out hereunder.
- 6.4 M/s L-1 Identity Solutions Operating Company shall perform the activities / services and carry out its obligations under the Contract with due diligence, efficiency and economy, in accordance with generally accepted techniques and practices used in the industry and with professional engineering and consulting standards recognized by international professional bodies and shall observe sound management, engineering and security practices. It shall employ appropriate advanced technology and engineering practices and safe and effective equipment, machinery, material and methods. M/s L-1 Identity Solutions Operating Company shall always act, in respect of any matter relating to this Contract, as faithful advisors to the Purchaser and shall, at all times, support and safeguard the Purchaser's legitimate interests in any dealings with Third parties.
- 6.5 Standards: The Goods supplied under this Contract shall conform to the standards mentioned in the Technical Specifications, and, when no applicable standard is mentioned, to the authoritative standards, such standard shall be the latest issued by the concerned institution. Delivery of the Goods shall be made by M/s L-1 Identity Solutions Operating Company in accordance with the terms specified by the Purchaser in its Notification of Award / Purchase Order.

## 7. Constitution of Consortium

- 7.1 For the purposes of fulfillment of its obligations as laid down under the Contract where the Purchaser deems fit and unless the context requires otherwise, M/s L-1 Identity Solutions Operating Company shall refer to the Prime Consortium Member who shall be the sole point of interface between the Purchaser and M/s L-1 Identity Solutions Operating Company and would be absolutely accountable for the performance of its own, the other members of Consortium and/or its Team's functions and obligations.

  
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Planning Office, 3rd Floor, 4th Floor, 5th Floor,  
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4. Scope of Work / Contract

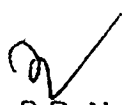
- 4.1 Scope of the Work/ Contract shall be as defined in Annexure E – Scope of Work and Annexes thereto of this Bid Document.
- 4.2 Purchaser has engaged M/s L-1 Identity Solutions Operating Company for Design, Supply and Implementation of Biometric Matching Services for UIDAI using which the Purchaser intends to perform its business operations. M/s L-1 Identity Solutions Operating Company is required to provide such goods, services and support as the Purchaser may deem proper and necessary, during the Terms of this Contract, and includes all such processes and activities which are consistent with the proposals set forth in the Bid, the Bid Document and this Contract and are deemed necessary by the Purchaser, in order to meet its business requirements (hereinafter 'Scope of Work').

5. Key Performance Measurements

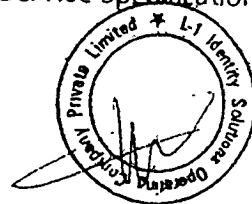
- 5.1 Unless specified by the Purchaser to the contrary, M/s L-1 Identity Solutions Operating Company shall deliver the goods, perform the Services and carry out the Scope of Work in accordance with the scope of this Contract, Scope of Work and the Service Specifications as laid down under Annexure C – Service Level Agreement to General Conditions of Contract.
- 5.2 The service specifications, as mentioned in Scope of Work of requirements of this Contract includes the requirements of the Purchaser, and any other requirements as are necessary to execute the Scope of Work under this Contract. If the Contract / Service Specification include more than one document, then unless the Purchaser specifies to the contrary, the later in time shall prevail over a document of earlier date to the extent of any inconsistency.
- 5.3 The Purchaser reserves the right to amend any of the terms and conditions in relation to the Contract / Service Specifications and may issue any such directions which are not necessarily stipulated therein if it deems necessary for the fulfillment of the Scope of Work.

6. Commencement and progress

- 6.1 M/s L-1 Identity Solutions Operating Company shall subject to the fulfillment of the conditions precedent set out in Clause 3 above, commence the performance of it's obligations in a manner as specified in the Scope of Work and Service Specifications.

  
B.B. Nanawati, DGS  
Unique Identification Authority of India  
Planning Commission  
Connaught Place

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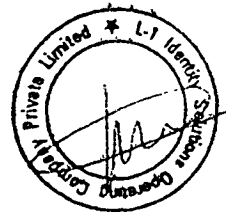
Operating Company in a form and manner acceptable to the Purchaser which would remain valid until such time, beyond the term of the Contract, as may be stipulated by the Purchaser.

- e. All the members of the Consortium shall have executed a binding Consortium Contract / Agreement a notarized copy of which shall have been delivered to the Purchaser.
- f. All the members of the Consortium shall have executed a Power of Attorney authorizing the Prime Consortium Member to act for and on behalf of the Consortium members, a notarized copy of which shall have been delivered to the Purchaser.
- g. Furnishing of such other documents as the Purchaser may specify

The Purchaser reserves the right to waive any or all of the conditions specified in Clause 3.1 above in writing and no such waiver shall affect or impair any right, power or remedy that the Purchaser may otherwise have.

  
B.B. Nanawati, DUG  
Unique Identification Authority of India  
Planning Commission, Jodhpur Road,  
Connaught Place, New Delhi

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- c. unless otherwise specified a reference to a clause, sub-clause or section is a reference to a clause, sub-clause or section of this Contract including any amendments or modifications to the same from time to time;
- d. a word in the singular includes the plural and a word in the plural includes the singular;
- e. a word importing a gender includes any other gender;
- f. a reference to a person includes a partnership and a body corporate;
- g. a reference to legislation includes legislation repealing, replacing or amending that legislation;
- h. where a word or phrase is given a particular meaning it includes the appropriate grammatical forms of that word or phrase which have corresponding meanings.
- i. in the event of an inconsistency between the terms of this Contract and the Bid, the terms hereof shall prevail.

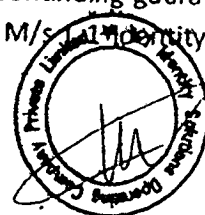
### 3. Conditions Precedent

3.1 This Contract is subject to the fulfillment of the following conditions precedent by M/s L-1 Identity Solutions Operating Company.

- a. Furnishing of an unconditional, irrevocable and continuing Bank Guarantee of the sum of Rs. 2,88,75,000, in a form and manner acceptable to the Purchaser which would remain valid until such time and be renewable as may be stipulated by the Purchaser.
- b. Execution of a Deed of Indemnity in terms of Clause 16 of this Contract
- c. Obtaining of all statutory and other approvals required for the performance of the Services under this Contract. This may include approvals/clearances, wherever applicable, that may be required for execution of this contract e.g. clearances from Government authorities for importing equipment, exemption of Tax/Duties/Levies, work permits/clearances for M/s L-1 Identity Solutions Operating Company / the team of M/s L-1 Identity Solutions Operating Company, etc.
- d. Where the designated M/s L-1 Identity Solutions Operating Company is a subsidiary of a company or a member of a group of companies or is a joint venture company or is special purpose vehicle (SPV) [formed to execute the obligations under this Contract] and where the Purchaser may specify (on account of the failure of M/s L-1 Identity Solutions Operating Company to fulfill all selection criteria specified in the Bid), the parent or flagship company/ majority shareholder of such M/s L-1 Identity Solutions Operating Company having furnished an unconditional, irrevocable and continuing guarantee of an amount equivalent to Rs. 2,88,75,000 on behalf of M/s L-1 Identity Solutions

  
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Connaught Place

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whether arising before or after the execution of this Contract and the right to ownership and registration of these rights.

XXVII. "Kick Off Meeting" means a meeting convened by the Purchaser to discuss and finalize the work execution plan and procedures with the Biometric Solution Provider.

XXVIII. "Service" means services to be provided as per the Annexure E - Scope of Work as specified in this bid document and incidental services, such as design, supply and implementation or any other such obligations of the Biometric Solution Provider covered under the Contract. In addition to this, the definition would also include other related/ancillary services that may be required to execute the Scope of Work under this contract.

XXIX. "Service Specification" means and includes detailed description, statements to technical data, performance characteristics, and standards (Indian as well as International) as applicable and as specified in the Contract, as well as those specifications relating to Industry standards and codes applicable to the performance of the work, work performance quality and specifications affecting the work or any additional specification required to be produced by the Biometric Solution Provider to meet the design criteria/ and/ or contract requirements.

XXX. "The Contract Value" means the sum of:

- a) The unit price per Allotted Enrolment Transactions times maximum of 10.5 Crore Allotted Enrolment Transactions, subject to the rules of dynamic allocation as per Annexure D - Work allocation & Service Levels, during Contract period and;
- b) The amount of Rs 5,00,00,000/- (Rupees Five Crore Only) towards delivery, installation and acceptance of hardware for both primary and business continuity sites of UIDAI for de-duplications of an estimated capacity of first 1(one) Crore Allotted Enrolments Transactions.

XXXI. "Notice" means:

- i. a notice; or
- ii. a consent, approval or other communication required to be in writing under this Contract.

## 2. Interpretation

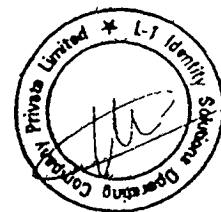
In this Contract unless a contrary intention is evident:

- a. the clause headings are for convenient reference only and do not form part of this Contract;
- b. unless otherwise specified a reference to a clause number is a reference to all of its sub-clauses;

B.B. Nanawati, DGS


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Planning Commission, New Delhi  
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- XV. **"Prime Consortium Member"** means the Prime Member of the Consortium, in case of a consortium bid. For the purpose of this contract **Prime Consortium Member** means the **Biometric Solution Provider**.
- XVI. **"Parties"** means the Purchaser and, the Biometric Solution Provider, and **"Party"** means either of the Parties.
- XVII. **"Contract"** means the Agreement entered into between the Purchaser and the Biometric Solution Provider including all attachments and Annexes thereto, the Bid and all Annexes thereto and the agreed terms as set out in the Bid, all documents incorporated by reference therein and amendments and modifications to the above from time to time.
- XVIII. **"De-Duplication"** means assurance through biometric comparisons that no enrolled person has been assigned more than one Unique ID number.
- XIX. **"Enrolment Transactions"** mean the transaction to perform de-duplication check in order to establish if there exists any duplicate(s) for the subject to be enrolled.
- XX. **"Allotted Enrolment Transactions"** mean the transaction allocated to a Biometric Solution to perform de-duplication in order to check if there exist any duplicate(s) for the subject being enrolled.
- XXI. **"Goods"** means all of the equipment, sub-systems, hardware, software, products accessories and/or other material / items which the Biometric Solution Provider is required to supply, install and maintain under the contract.
- XXII. **"System"** means all of the goods under the scope of this contract together as an integrated solution.
- XXIII. **"Commissioning of System"**: The system shall be deemed to have been commissioned, when all the activities as defined in Clause 9.3 under Annexure E - Scope of Work have been successfully executed and completed.
- XXIV. **"Acceptance of System"**: The system shall be deemed to have been accepted by the Purchaser, subsequent to its commissioning, when all the activities as defined in Clause 10 under Annexure E - Scope of Work have been successfully executed and completed.
- XXV. **"Effective Date"** means the date on which this Contract is signed and executed by the parties hereto. If this Contract is executed in parts, then the date on which the last of such Contracts is executed shall be construed to be the Effective Date;
- XXVI. **"Intellectual Property Rights"** means any patent; copyright, trademark, trade name, service marks, brands, propriety information, UIDAI Application Software

  
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Planning Commission, Government of India,  
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Parties hereto / Biometric Solution Provider's Team by virtue of this Contract that:

- a. is by its nature confidential or by the circumstances in which it is disclosed confidential; or
- b. is designated by the disclosing Party as confidential or identified in terms connoting its confidentiality;

but does not include information which is or becomes public knowledge other than by a breach of this Contract;

- VII. "The Purchaser" means the President of India acting through the Director General, Unique Identification Authority of India (UIDAI), Planning Commission, Government of India
- VIII. "Purchase Officer" means the officer signing the acceptance of bid and includes any officer who has authority to execute the relevant contract on behalf of the Purchaser.
- IX. "UIDAI", means the Director General, Unique Identification Authority of India (UIDAI) or any other representative authorized by the Director General.
- X. "Document" means any embodiment of any text or image however recorded and includes any data, text, images, sound, voice, codes or and databases or microfilm or computer generated micro fiche.
- XI. "Purchaser's Representative/Project Coordinator" means the person or the persons appointed by the Purchaser from time to time to act on its behalf for overall co-ordination, supervision and project management.
- XII. "Primary Site" means the Central ID Data Repository ("CIDR") Data Center in Delhi that would house the Information and Communication Technology (ICT) equipment required for carrying out the centralized operations of CIDR.
- XIII. "BCP Site" means the Business Continuity Site of the CIDR located at a Data Centre in Bangalore that would house ICT equipment similar to the Primary site and which would be capable of running business operations of the CIDR in case of an eventuality.
- XIV. "Datacenter Sites" means the Primary and BCP site of the CIDR including their respective Data Center space, Communications Room and Non-Data Centre space wherein the delivery, installation, integration, management and maintenance services as specified under the Annexure E - Scope of Work are to be carried out for the purpose of this Contract. Each individually referred to as Datacenter Site and collectively as Datacenter Sites.

  
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Connaught Place, New Delhi-110001

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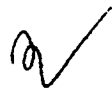
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## General Conditions of Contract

### 1. Definitions

In this Contract, the following terms shall be interpreted as indicated:

- I. "Acceptance of Bid" means the letter/fax or any memorandum communicating to the bidder, the acceptance of his bid, and includes an advance acceptance of his bid.
- II. "Business Day" means any day that is not a Sunday or a public holiday (as per the official holidays observed by UIDAI).
- III. The "Biometric Solution Provider" means the successful bidder whose bid has been accepted by the Purchaser and with whom the order for providing a turnkey solution towards Design, Supply and Implementation of Biometric Matching Services has been placed as per requirements and terms and conditions specified in this Bid/contract and shall be deemed to include successors of M/s L-1 Identity Solutions Operating Company, representatives (approved by the Purchaser), heirs, executors, administrators and permitted assigns, as the case may be, unless excluded by the terms of the contract. "Biometric Solution Provider" or "BSP" in this contract refers to M/s L-1 Identity Solutions Operating Company.
- IV. "Biometric Solution Provider's Team" means the Successful Bidder alone or along with all of its consortium members, who have to provide goods & services to the Purchaser under the scope of this Bid / Contract. This definition shall also include any and/or all of the employees of the Prime Consortium Member, consortium members, authorized service providers/partners/agents and representatives or other personnel employed or engaged either directly or indirectly by the Biometric Solution Provider for the purposes of this Bid / Contract. "Biometric Solution Provider's team" or "BSP's team" in this contract refers to the team of M/s L-1 Identity Solutions Operating Company
- V. "Biometric Solution Provider's Representative/ Project Coordinator" means the person or the persons appointed by the Biometric Solution Provider from time to time to act on its behalf for overall co-ordination, supervision and project management.
- VI. "Confidential Information" means any information disclosed to or by any Party to this Contract and includes any information in relation to the Parties, a third party any other person any such information that may come to the knowledge of the

  
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SUMMARY OF RESEARCH

INTRODUCTION

1. This report has been prepared to assist the Centre for Law and Policy Research in drafting a petition to the Supreme Court of India, challenging the constitutional validity of the Unique Identification Number (UID) scheme, otherwise known as the 'Adhaar' scheme.
2. The UID scheme aims to issue all 1.2 billion Indian residents with a universal identification number, linked with biometric and demographic data that will be stored on a centralized database. Three types of biometric data will be collected facial photographs, finger prints and iris scans.<sup>1</sup> If completed, this will be world's largest biometric database. However, India currently lacks comprehensive data privacy protection laws and the draft National Identification Authority of India Bill 2010 contains limited safeguards.<sup>2</sup>
3. OPBP has been requested to prepare research on two questions:
  - (a) Have biometric identification schemes in other countries been challenged on privacy grounds?

- (b) In jurisdictions that collect biometric data what measures are in place to protect citizens right to privacy?
4. Our research covers right jurisdictions, selected because they use biometric identification schemes and based on the expertise of our researchers. These are the United States of America (US), Israel, Australia, the Council of Europe, the European Union (EU), the United Kingdom (UK), France, and Germany.
5. This report consists of two parts. This part, Part A, provides a summary of our research, drawing out key points that are relevant to the petition challenging the UID scheme. Part B provides information on the specific jurisdictions, dividing the discussion of each jurisdiction into three sections: an overview of the jurisdiction, the relevant legal framework, and the relevant case law on biometric identification schemes. Where there is no case law, we have considered the political debates over these schemes. We hope that Part B will be useful should the Centre for Law and Policy Research wish to explore the issues discussed in this summary in greater detail.

6. This summary covers four topics:

- a. Background;
- b. Biometric information and the right to privacy;
- c. The justification of interferences with privacy rights;
- d. Safeguards for the protection of biometric data.

#### BACKGROUND

7. In the US, Israel, France, and Germany, the right to privacy is constitutionally and legislatively protected. In these jurisdictions, either the written constitutions have expressly enumerated the right to privacy or one of their provisions has been interpreted as including this right. The European Convention on Human Rights (applicable in the Council of Europe Member States) and the European Charter on Fundamental Rights and Freedoms (applicable in the EU) expressly contain a right to privacy. In Australia and the UK,<sup>3</sup> although the right to privacy is not constitutionally protected, it is protected by primary legislation.

8. All of the jurisdictions in our study have data protection laws which apply to personal data. In the European context, 'personal data' is defined as 'any information relating to an identified or identifiable

individual'.<sup>4</sup> Biometric data is considered to be a class of personal data and is therefore subject to protection.<sup>5</sup> A similar approach has been adopted in the US,<sup>6</sup> Israel,<sup>7</sup> and Australia.<sup>8</sup>

9. Biometric identification schemes are in operation in all of the jurisdictions considered in this study. The purposes of these schemes are diverse and include the prevention of crime,<sup>9</sup> immigration control,<sup>10</sup> identity protection<sup>11</sup> and the maintenance of security standards for passports.<sup>12</sup>

#### BIOMETRIC INFORMATION AND THE RIGHT TO PRIVACY

10. In the European context, the collection of personal data in databases by the state, including the collection of biometric data, is generally considered to be an interference with the right to privacy, requiring justification.<sup>13</sup>

11. In *S and Marper v United Kingdom*<sup>14</sup> the European Court of Human Rights (ECtHR) held that:

The mere retention and storing of personal data by public authorities, however obtained, are to be regarded as having direct impact on the private-life interest of an individual concerned, irrespective of whether subsequent use is made of the data.<sup>15</sup>

The applicants were arrested and charged with criminal offences in the UK. One of the applicants was acquitted and the case against the other was discontinued. Deciding on whether it was permissible for the UK police to retain fingerprints, cellular samples and DNA samples collected from the applicants, the Grand Chamber of the ECtHR observed that these data fell within the realm of 'personal data' and the retention and storage of these data was an interference with the applicants' Article 8(1) right to a private life under the European Convention on Human Rights (ECHR).<sup>16</sup> The Court ultimately found that this interference was disproportionate.<sup>17</sup>

12. The German Federal Constitutional Court adopted a similar approach in the *Census Act Case*.<sup>18</sup> This case involved a challenge to the National Census Act 1983, which placed an obligation on every household to fill in and return a census form for the collection of statistical data. There the Court held that the protection of 'informational self-determination' fell within the ambit of the 'right to the free development of one's personality' under article 2(1) of the German Constitution:

Individual selfdetermination, however, presupposes— even under the conditions of modern information processing techniques – that the individual has the freedom to decide whether to perform or omit actions, including the possibility of acting according to this decision. A person who cannot safely tell what information about him regarding certain areas is known to his social environment, and cannot to some extent assess the knowledge of potential partners of communication, can be essentially inhibited in his freedom to make autonomous plans and decisions. ....*It follows that the free development under the modern conditions of data processing presupposes the protection of the individual against unlimited collection, storage, use and transmission of his personal data.*<sup>19</sup>

13. In a 2012 decision, the French Constitutional Court, the *Conseil Constitutionnel*, affirmed a similar principle in striking down portions of a law authorizing the implementation of a national biometric identification scheme and the creation of a national biometric database.<sup>20</sup> The *Conseil* held that biometric data constitute ‘personal data’ and the right to respect for private life under the French Constitution requires that:



The collection, registration, conservation, consultation and communication of personal data must be justified on grounds of general interest and implemented in an adequate manner, proportionate to this objective.<sup>21</sup>

14. The US Supreme Court has also confirmed that the right to privacy under the US Constitution includes 'an individual interest in avoiding disclosure of personal matters'.<sup>22</sup> However, the US is distinct from the European jurisdictions in that it does not engage in a two-stage balancing exercise. Instead, justificatory considerations are built into the enquiry whether the right to privacy has been violated, with the result that mere collection, storage, or disclosure of personal data are not considered to be automatic violations of this right.<sup>23</sup>

#### THE JUSTIFICATION OF INTERFERENCES WITH PRIVACY RIGHTS

15. The Jurisdictions considered in this report apply different tests in ascertaining whether the restrictions imposed on the right to privacy are justified. Courts in the EU and the Council of Europe apply a three-part test requiring that limitations must: (a) be in accordance with the law; (b) serve a legitimate aim; and (c) be 'necessary in a

democratic society'.<sup>24</sup> The last requirement involves a proportionality analysis, requiring the Court to determine whether the limitation is suitable for achieving its aim (suitability), and whether the extent of the limitation is outweighed by the achievement of the aim (proportionality in the 'narrow sense').<sup>25</sup>

16. In the US, a softer standard of review has been applied in privacy cases, with courts largely focusing on the rationality of legislative restrictions on the right to privacy.<sup>26</sup> However, the degree of deference accorded by courts to the legislature and the executive has often depended upon the nature of the information sought to be collected. In *Whalen v Roe*.<sup>27</sup> a statute that required physicians to report details of patients to whom they had prescribed certain drugs was challenged on privacy grounds. Although the US Supreme Court concluded that the statute did not constitute a violation of the right to privacy, Justice Brennan observed that '[t]he central storage and easy accessibility of computerized data vastly increase [d] the potential for abuse of that information' and that future developments might compel 'some curb on such technology'.<sup>28</sup> Further,

courts have looked upon databases storing 'sensitive information' (as the term is understood in the US) with a more critical eye. In *US v Westinghouse*,<sup>29</sup> the Court of Appeals for the Third Circuit declined a challenge to a subpoena granted to a health and safety inspector mandating an employer to disclose its employees' medical records. The Court held that the constitutional right to privacy had not been breached, since the information contained in the medical records was not 'sensitive'.<sup>30</sup> It laid down a number of factors that should be considered in deciding whether an individual's right to privacy was violated, including 'the type of record... the information it does or might contain, the potential for harm in any subsequent nonconsensual disclosure, the injury from disclosure to the relationship in which the record was generated'.<sup>31</sup> The point was put clearly by the Court of Appeals for the Ninth Circuit in *Doe v Attorney General*; 'the more sensitive the information, the stronger the state's interest must be'.<sup>32</sup>

17. The US understanding of 'sensitive information' should be contrasted with the definition of 'sensitive

data' in other jurisdictions. In Europe and jurisdictions inspired by the European data protection model, sensitive data is defined as personal data revealing certain protected characteristics, including 'racial origin, political opinions or religious or other beliefs, as well as personal data concerning health or sexual life [and]... relating to criminal convictions'.<sup>33</sup> Some, but not necessarily all, types of biometric data may be classified as sensitive information. The EU Working Party on the Protection of Individuals with Regard to the Processing of Personal Data suggests that facial images in particular should be regarded as sensitive data s they have the potential to reveal ethnic or racial origin.<sup>34</sup> Sensitive data is subject to heightened safeguards and may not be automatically processed except in defined circumstances. In Australia, the Privacy Act 1998 was recently amended to include all biometric data as 'sensitive information', which must be managed with particular care.<sup>35</sup>

18. Other types of data that have resulted in courts being less deferential include data with personal references (which are not anonymised or

statistically prepared)<sup>36</sup> and personal data that have undergone automatic processing.<sup>37</sup>

## SAFEGUARDS FOR THE PROTECTION OF BIOMETRIC DATA

### a) Legal safeguards

19. Given that the collection, processing and storage of biometric data are generally considered to be interferences with the right to privacy, adequate legal safeguards are required for these interferences to be justified. In General Comments 16 on the article 17 right to privacy in the International Covenant on Civil and Political Rights, the Human Rights Committee emphasized that:

The gathering and holding of personal information on computers, data banks and other devices, whether by public authorities or private individuals or bodies, must be regulated by law. Effective measures have to be taken by States to ensure that information concerning a person's private life does not reach the hands of persons who are not authorized by laws to receive, process and use it, and it, and is never used for purposes incompatible with the Covenant. In order to have the most effective protection of his private life, every individual should have the right to ascertain in an intelligible form, whether, and if so, what personal data is stored in automatic

data files, and for what purposes. Every individual should also be able to ascertain which public authorities or private individuals or bodies control or may control their files. If such files contain incorrect personal data or have been collected or processed contrary to the provisions of the law, every individual should have the right to request rectification or elimination.<sup>38</sup>

Similarly, In *Marper*, the ECtHR stressed that:

The protection of personal data is of fundamental importance to a person's enjoyment of his or her right to respect for private... life, as guaranteed by Article 8 of the Convention. The domestic law must afford appropriate safeguards to prevent any such use of personal data as may be inconsistent with guarantees of this Article. The need for such safeguards is all the greater where the protection of personal data undergoing automatic processing is concerned... the domestic law should notably ensure that such data are relevant and not excessive in relation to the purposes for which they are stored; and preserved in a form which permits identification of the data subjects for no longer than is required for the purpose for which those data are stored. The domestic law must also afford adequate guarantees that retained personal data was efficiently protected from misuse and abuse....<sup>39</sup>

b) *Common features of safeguards*

20. The countries in this study have adopted very similar legal safeguards governing the collection, use and storage of personal data, including biometric data. These safeguards are framed and applied in somewhat different ways, but they share at least nine common features;<sup>40</sup>
- a. *Purpose specification:* Data must be collected for specified, explicit and legitimate purposes.
  - b. *Data quality:* Data collected should be relevant and necessary to accomplish the legitimate purposes for which it is being collected.
  - c. *Data collection:* Data should be given with the consent or knowledge of the data subjects.
  - d. *Notice:* Data subjects should be informed about the purposes for which the data are being collected, the authority authorizing data collection, whether disclosure is mandatory or voluntary, and the consequences of non-provision, among other matters.
  - e. *Limitations on use:* The data should only be used for the purposes originally specified, or purposes compatible with those purposes. Restrictions also apply to the transfer of data between state organs

and between the state and private organisations or individuals.

- f. *Security*: Appropriate security measures should be in place to ensure the security, integrity and confidentiality of personal data.
- g. *Access*: Data subjects should have a right to access their personal data held in databases.
- h. *Correction*: Data subjects should have the right to update and correct this data.
- i. *Independent data protection authority*: All jurisdictions in this study also provide for an independent data protection authority to monitor compliance with data privacy safeguards and to investigate and act on complaints.

21. As noted above, European and European-inspired jurisdictions also require heightened safeguards for 'sensitive data', relating to certain protected characteristics.<sup>41</sup>

c) Challenges to biometric identification schemes

22. Our research has identified three recent cases involving challenges to biometric identification schemes: the ECtHR's decision in *S and Marper v United Kingdom*,<sup>42</sup> the petition against Israel's biometric identification scheme in *Nabon v Knesset*,



<sup>43</sup> and the French *Conseil Constitutionnel* decision on the national biometric identity card scheme.<sup>44</sup> In these cases, the existence and adequacy of legal safeguards were central to the courts' assessment of whether these interferences with the right to privacy were justified.

*i) S and Marper v United Kingdom*

23. As introduced above, in *Marper* the applicants argued that the UK police's retention of their fingerprints, cellular samples and DNA profiles after charges against them were dropped was inconsistent with the right to respect for private life enshrined in Article 8 ECHR. In assessing whether this interference was proportionate, the Court placed weight on the fact that the UK was the only Member State of the Council of Europe which permitted indefinite retention of fingerprint and DNA data.<sup>45</sup> It compared the practice of the majority of other Member States, which required such samples to be removed or destroyed either immediately or within a certain time after acquittal or discharge.<sup>46</sup> The blanket and indiscriminate nature of its powers of retention meant that the UK had overstepped its margin of appreciation and

failed to strike a fair balance between the competing public and private interests. Accordingly, the retention of the applicants' data was a disproportionate interference with their right to respect for private life and constituted a violation of Article 8 ECHR.<sup>47</sup>

24. The Grand Chamber's approach in *Marper* therefore indicates that a national system of collection and retention of biometric information must incorporate sufficient safeguards in order adequately to protect the right to respect for private life under the ECHR. It appears that by 'appropriate safeguards', the Court means that the law must include requirements against indefinite storage.<sup>48</sup>

ii) *Nabon v Knessel*

25. The necessity of collecting biometric data in a centralized database was debated in the Israeli High Court of Justice in *Nabon v Knessel*.<sup>49</sup> The petitioners challenged the Israeli Law for Including Biometric Identifying Means and Data in Documents of Identification and in Databases 2009 and a proposed two-year pilot programme to test biometric identification. The legislation provides for the embedding of biometric data (fingerprints and

computerized tags of facial features) in Israeli identification cards and passports, and allows for the creation of a database containing biometric data on all Israeli citizens.<sup>50</sup> The petitioners specifically challenged the creation of a central database of biometric identification, arguing that this was not necessary to achieve the purpose of accurately identifying Israeli citizens.<sup>51</sup> It was argued that it was possible to embed biometric data on smart ID cards and to check identity against these cards, without creating a centralized database. The Court ultimately dismissed the petition as premature, given that the pilot programme had not yet been completed. However, at the hearing the Justices strongly criticized the scheme, demanding that the Interior Ministry rework its planned pilot programme to evaluate whether it is actually necessary to store the population's biometric data in a single, centralized database. In the wake of the 2006 theft and dissemination of Israel's Population registry, containing data on nine million Israeli citizens, the Justices were particularly concerned that a centralized biometric database would bring greater security risks.<sup>52</sup> Since the hearing, the

Interior Ministry has been exploring other options,<sup>53</sup> as well as evaluating safeguards to prevent data leaks and information theft.<sup>54</sup>

*iii) Conseil Constitutionnel decision*

26. In 2012, the French Constitutional Court, the *Conseil Constitutionnel* (*Conseil*), struck down portions of legislation which introduced a national identity card containing biometric information (face image and fingerprints), and provided for the creation of a national database for this data.<sup>55</sup> The court found that the Act served the legitimate aim of preventing identity fraud. However, the *Conseil* found that the legislation exceeded this legitimate purpose by authorizing the police and other law enforcement agencies to access the database for purposes unrelated to the prevention of fraud.<sup>56</sup> Therefore, the *Conseil* found that this was a disproportionate restriction of the right to privacy.<sup>57</sup> It should be noted, however, that the *Conseil* did not take issue with the creation of a population-wise biometric database per se.<sup>58</sup>

## UNITED STATES

## OVERVIEW

27. Federal agencies have authority to collect personally-identifiable information. The principal federal biometric schemes in the US are the Integrated Automated Fingerprint System (IAFIS) and the Automatic Biometric Identification System (IDENT). Databases at the federal and state level are 'interpretational' and integrated.<sup>59</sup>

*a) IAFIS*

28. The IAFIS is a FBI- maintained automated fingerprint identification and criminal history database. It contains a range of information: fingerprints; criminal histories; mug shots; physical characteristics such as height, weight and hair and eye colour; and aliases. The IAFIS also includes the fingerprints of current and former US military personnel and federal government employees. It is currently the largest biometric database in the world.<sup>60</sup>

*b) IDENT*

29. The IDENT is a system for storing and processing biometric, limited biographic and encounter-related information, administered by the Department of

Homeland Security.<sup>61</sup> It includes the US-VISIT program, which collates biometric data from non-citizens seeking entry. Originally developed for immigration control purposes, the system is now used for 'national security, law enforcement, immigration, intelligence and other DHS mission-related functions.'<sup>62</sup>

*c) Other*

30. In addition, each state has its own biometric database and a DNA database.<sup>63</sup> Fingerprinting is pervasive and is required by numerous state and federal laws across a range of non-criminal contexts, such as federal securities law<sup>64</sup> and laws concerning employment in bartending<sup>65</sup> and day-care.<sup>66</sup>

*LEGAL FRAMEWORK*

*a) Overview*

31. The Supreme Court held that privacy interests are protected under 1<sup>st</sup>, 4<sup>th</sup> and 14<sup>th</sup> Amendments of the Constitution.<sup>67</sup> States have also recognized a qualified right to privacy, expressly or impliedly.<sup>68</sup>
32. The US is considered to be an outlier among developed countries, as it does not have

comprehensive data privacy legislation applying to both the public and private sector.<sup>69</sup>

33. At the federal level, the key piece of legislation is the Privacy Act 1974,<sup>70</sup> a federal statute placing general safeguards on information processed and held by the federal government.<sup>71</sup> This is supplemented by Guidance<sup>72</sup> and Privacy Impact Assessments.<sup>73</sup>
34. A huge number of additional federal and state statutes relate to individual privacy rights in discrete areas.

*b) Safeguards under the Privacy Act 1974*

35. The Act requires federal agencies, as data collectors, to adopt minimum standards for the collection, use, maintenance and dissemination of personal records.<sup>74</sup> However, the statute has been criticized for failing to provide sufficiently robust protection, particularly in relation to biometrics.<sup>75</sup> The establishment of a separate commission to ensure oversight of the Privacy Act was resisted. The act thus fell under the purview of the Office of Management and Budget and implementation has

been deemed unsatisfactory.<sup>76</sup> The Act's main requirements are explained below.

*i) No disclosure without consent (subject to significant exceptions)*

36. Federal agencies are prohibited from disclosing any record, 'except pursuant to a written request by or with the prior written consent of the individual to whom the record pertains.<sup>77</sup> However, this general rule is subject to 12 enumerated exceptions.<sup>78</sup>

*ii) Individual right of information and access*

37. The data subject must be informed of the authority authorizing data collection; whether disclosure is mandatory or voluntary; the purposes of use of the data; and the effects the data subject will face for non-provision of the information.<sup>79</sup> The Act also requires federal agencies to grant access to the data subject and provide an opportunity to correct any errors in the information.<sup>80</sup> The agency must then either correct the portion of the record or notify the individual of its refusal to do so (in which case there is an appeals process to be followed)<sup>81</sup> within 10 days.<sup>82</sup>

*iii) Relevant and necessary information*



38. The agency shall maintain, 'only such information about an individual as is relevant and necessary to accomplish a purpose of the agency required to be accomplished by statute or executive order'.<sup>83</sup> Further, information should be collected directly from the individual, 'to the greatest extent practicable'.<sup>84</sup>

*iv) Data safeguarding*

39. 'Appropriate administrative, technical, and physical safeguards' are required 'to insure the security and confidentiality of records and to protect against anticipated threats of hazards to their security or integrity'.<sup>85</sup>

40. We are unaware of any cases, outside the criminal context, in which the collection and storage of biometric data has been challenged. However, the case-law below may offer some guidance.

41. In personal data cases, the Court tends to adopt a 'rational basis' review, asking whether the government has demonstrated a 'legitimate aim' and a 'rational connection' between the aim and the means used.<sup>86</sup> However, there is a suggestion that heightened scrutiny may apply where the personal data is especially sensitive.<sup>87</sup>

a) *Informational privacy: constitutional challenges*

i) *Whalen v Roe (US Supreme Court) (1977)*<sup>88</sup>

42. New York Statutes required physicians to report details of patients to whom they had prescribed certain drugs. The details were stored by the New York State Department. A group of patients and doctors challenged the statute on privacy grounds. The Supreme Court held the program did not pose a sufficiently serious threat to privacy to constitute a privacy violation.

43. Firstly, the Court recognized that the right to privacy included, 'an individual interest in avoiding disclosure of personal matters'.<sup>89</sup> Second, the Court concentrated on the 'orderly and rational' legislative process behind the New York statute.<sup>90</sup> Thirdly, the Court paid attention to the steps the agency had taken to prevent unauthorized disclosures of information. This enabled it to conclude that the statutory scheme 'evidence[d] a proper concern with, and protection of, the individual's interest in privacy'.<sup>91</sup>

44. Finally, the Supreme Court did express general concerns about privacy and emerging technologies. Mr. Justice Stevens remarked,

We are not unaware of the threat to privacy implicit in the accumulation of vast amounts of personal information in computerized data banks or other massive governments files.<sup>92</sup>

ii) *US V Westinghouse (US Court of Appeals, 3<sup>rd</sup> Circuit) (1980)*<sup>94</sup>

46. A subpoena granted to a health and safety inspector mandating an employer to disclose its employees' medical records was challenged as a violation of their constitutional right to privacy. The US Court of Appeals held there was no violation since: the material contained in the medical records was not 'sensitive';<sup>95</sup> effective security arrangements were in place;<sup>96</sup> and there was a strong public interest in allowing the health and safety inspector to have access to the medical records in this case.

47. The Court of Appeals held:

Proliferation in the collection, recording and dissemination of individualized information has made the public, Congress and the judiciary increasingly alert to the threat such activity can pose to one of the most fundamental and cherished rights of American citizenship, falling within the right characterised by Justice Brandeis as 'the right to be let alone'... Much of the concern has been with the governmental accumulation of

data and the ability of government officials to put information technology to uses detrimental to individual privacy, which have been facilitated by the spread of data banks and by the increasing storage in computers of sensitive information relating to the personal lives and activities of private citizens.<sup>98</sup>

*b) Fingerprinting: constitutional challenges in the non-criminal context*

*i) Thom v New York Stock Exchange (Dist. Court, SD*

49. A law requiring the fingerprinting of employees belonging to firms that carried out security exchanges was challenged on multiple grounds, including invasion of privacy. In a state level court, Edward Weinfeld Dj propounded a 'rational basis' test:

The state having presented a valid justification... for the original taking of the prints under reasonable circumstances, their use for future identification purposes, even in criminal investigations, is not impermissible.<sup>100</sup>

*ii) Iacobucci v City of Newport, Ky (US Court of Appeals, 6<sup>th</sup> Circuit) (1986)<sup>101</sup>*

50. A City ordinance requiring employees, at places where liquor is served, to be fingerprinted by the

police was found to be constitutional. Martin Cj, citing *Thom* (above), reasoned that, 'the ordinance bears a rational relationship to a legitimate governmental interest, we view it as a proper exercise of the City's police power'.<sup>102</sup>

51. He then went on provide a hierarchy of protected personal information:

Whatever the outer limits of the right to privacy, clearly it cannot be extended to apply to a procedure the Supreme Court regards as only minimally intrusive Enhanced protection has been held to apply only to such fundamental decisions as contraception.... And family living arrangements. Fingerprints have not been held to merit the same level of constitutional concern.

TRUE TYPED COPY



DELHI

Dt. NZL

344061

## CONTRACT AGREEMENT

THIS CONTRACT AGREEMENT ("Agreement") made the 24<sup>th</sup> day of August 2010

## BETWEEN

The President of India acting through the Director General, Unique Identification Authority of India (UIDAI) (hereinafter referred to as "Purchaser") which expression shall unless repugnant to the context or meaning thereof mean and be deemed to include its authorized agents, representatives and permitted assigns of the One Part.

## AND

The Party M/s L-1 Identity Solutions Operating Company Private Limited, a company incorporated under the Indian Companies Act 1956 having its registered office at 2, Frontline Grandeur, 14 Walton Road, Bangalore 560001 (hereinafter referred to as "L-1 India"), a subsidiary of L-1 Identity Solutions Operating Company, a Delaware U.S.A. corporation (Identified in Purchaser's Bid Document as the "Prime Consortium Member" and "Prime Bidder" and hereinafter referred to as "Biometric Solution Provider" or "BSP"), which expression shall unless repugnant to the context or meaning thereof mean and be deemed to include its successors and permitted assigns of the Other Part.



*B. B. Nanawati*

B.B. Nanawati, 800

Principal Secretary, Unique Identification Authority of India, New Delhi

WHEREAS

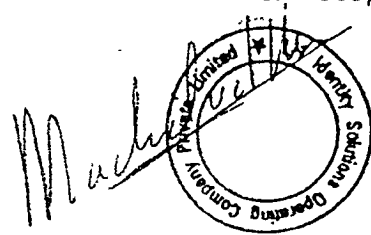
- (a) The Purchaser had invited bids vide their Bid Document number: Bid No. D-11018/14/Tech/10-UIDAI for providing certain services, namely, Design, Supply and Implementation of Biometric Solution” for Unique Identification Authority of India (hereinafter referred to as “Bid Document”);
- (b) The BSP had submitted its proposal dated 21.06.2010 (hereinafter referred to as the ‘Bid’) for the provision of such services in accordance with BSPs proposal as set out in its Bid and in accordance with the terms and conditions of the RFP and this Agreement;
- (c) The Purchaser has agreed to appoint the BSP for the provision of such services and the BSP has agreed to provide those services as are represented in the Bid, including the terms of this Agreement, the Annexures and Scope attached hereto and in accordance with the terms of the Bid, and in terms of the discussions, negotiations and clarifications in relation to the implementation of the scope of work and the Agreement;
- (d) While the BSP is bound to all of the provisions of this Agreement, in accordance with the requirements of the Purchaser’s Bid Document (Section II, clause 34.5) and the Purchaser’s earlier issued Invitation for Expression of Interest (clause 4 3(ii).b), the BSP established L-1 India for the purposes of signing this Agreement with the Purchaser;
- (e) In consideration of the foregoing and the mutual covenants and promises contained herein and other good and valuable consideration the receipt and adequacy of which is hereby acknowledged, the parties intending to be bound legally, for implementation of this Agreement;

**NOW THIS AGREEMENT WITNESSETH AS FOLLOWS:**

1. In this Agreement words and expressions shall have the same meanings as are respectively assigned to them in the General Conditions of Contract referred to;
2. The following documents and the provisions thereof shall be deemed to form and be read and construed as part of this Agreement (hereinafter the "Contract") viz:

a. General Conditions of Contract	<b>Annexure A</b>
b. Special Conditions	<b>Annexure B</b>
c. Service Level Agreement (SLA)	<b>Annexure C</b>
d. Work Allocation & Service Level	<b>Annexure D</b>
e. Scope of Work Annexure thereto	<b>Annexure E</b>

B.B. Nanawati, DDC

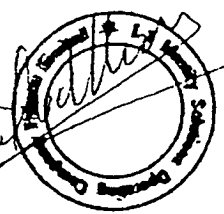


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f. Minimum Requirements	Annexure F
g. Letter for withdrawing the Deviations	Annexure G
h. Break-up of cost components	Annexure H
i. Non Disclosure Agreement	Annexure I
j. Clarifications dated 5 <sup>th</sup> , 7 <sup>th</sup> , 15 <sup>th</sup> , 16 <sup>th</sup> of June 2010 issued by the Purchaser	
k. Technical Bid submitted by BSP	Annexure J
l. Commercial Bid submitted by BSP	Annexure K
m. Acceptance Letter of L1 Bidder commercial quote	Annexure L
n. The Purchaser's order dated 30 <sup>th</sup> July 2010	Annexure M

3. In consideration of the payments to be made by the Purchaser to L-1 India as hereinafter mentioned, the BSP hereby covenants with the Purchaser to provide the Goods/ Services and to remedy defects therein in conformity in all respects with the provisions of the Contract. Brief particulars of the goods and / or services which shall be supplied/ provided by the BSP along with cost/charges thereof are as per Annexure H;
4. The Purchaser hereby covenants to pay L-1 India in consideration of the provision of the Services and the remedying of defects therein, the Contract Price or such other sum as may become payable under the provisions of the Contract at the times and in the manner prescribed by the Contract;
5. The Parties intend for the entire provisions of each of the aforesaid documents to be read together harmoniously to form the Contract and to regulate their relationship *inter se*. In the event of any conflict in the provisions of the above listed documents, the order of precedence of the provisions thereof shall be in the order as set out above;
6. Subject to the rules of dynamic allocation as per Annexure D – Work allocation & Service Levels and any mutually agreed upon Change Orders between the parties, the Contract Value shall not exceed Rs.33,87,50,000/- (Rupees Thirty Three Crores Eighty Seven Lakh Fifty Thousand Only)(inclusive of all Taxes) for an estimated maximum of 10.50 crore Allotted Enrolment Transactions after successful de-duplication, at the cost of Rs.2.75 (Rupees Two and Paise Seventy Five only) (inclusive of all Taxes) per Allotted Enrolment Transaction. The aforesaid total Contract value includes the amount of Rs. 5,00,00,000/- (Rupees Five Crore Only) towards delivery, installation and acceptance of hardware for both primary and business continuity sites of UIDAI for de-duplications of an estimated capacity of first 1(one) crore Allotted Enrolments Transactions;

*Mach...*



*B.B. Nanawati*  
 B.B. Nanawati, DCG  
 Unique Identification Authority of India  
 Planning Commission, Jeevan Bharat  
 Connaught Circus, New Delhi-110001

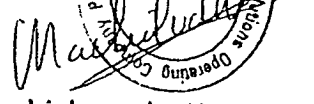
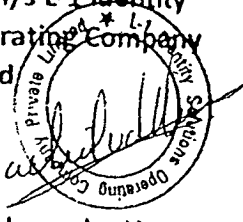


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7. This Contract and its stipulated obligations and conditions shall be effective from 30.07.2010 (hereinafter "the said date") i.e. the date of issue of Firm Orders and shall be valid initially for a period of two (2) years or completion of 20 Crores enrollment transactions, whichever is earlier, from the said date;

IN WITNESS whereof the parties hereto have caused this Agreement to be executed in accordance with their respective laws the day and year first above written.

Signed, Sealed and Delivered for & on behalf of M/s L-1 Identity Solutions Operating Company Private Limited

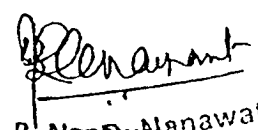
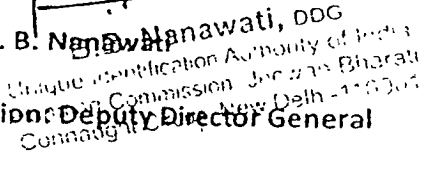
Signed  

Name: Machiel van der Harst

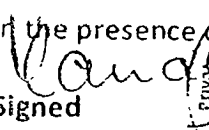
Designation: Technical Officer

Date: August 24<sup>th</sup>, 2010  
Place: New Delhi

Signed, Sealed and Delivered for and on behalf of the President of India acting through the Director General, Unique Identification Authority of India.

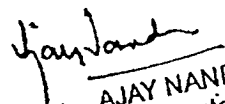
Signed   
Name: B. B. Nandanawati, DDC  
  
Designation: Deputy Director General

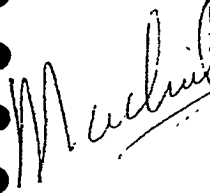
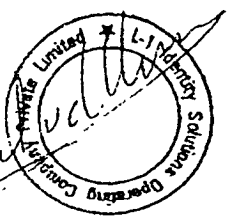
Date: August 24<sup>th</sup>, 2010.  
Place: New Delhi

In the presence  
Signed 

Name: Kalidindi R N  
Designation: Director, Business Development, L1 ID  
Date: August 24<sup>th</sup>, 2010  
Place: New Delhi

In the presence of:

Signed   
Name: Ajay Nandan  
Designation: Assistant Director General, Unique Identification Authority of India, Planning Commission, New Delhi-110001  
Date: August 24<sup>th</sup>, 2010  
Place: New Delhi

Unique Identification Authority of India  
 (Planning Commission)  
 Tower - II, 3rd Floor  
 Jeevan Rakshak Bhawan  
 Connaught Place  
 New Delhi - 110029

708

South  
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435  
Annexure RA-2

**INDIAN NON-JUDICIAL STAMP PAPER OF 500  
RUPEES**

Delhi

344061

**CONTRACT AGREEMENT** *DT. NZL*

This Contract Agreement ("Agreement") made the 24<sup>th</sup> day of August 2010

Between

The president of India acting through the director General Unique Identification Authority of India (UIDAI) (hereinafter referred to as "Purchaser") which expression shall unless repugnant to the context or meaning thereof mean and be deemed to include its authorized agents, representatives and permitted assigns of the one Part.

And

The Party M/s L-1 identity Solutions Operating Company Private Limited, a company incorporated under the Indian companies Act 1956 having its registered office at 2, Frontline Grandeur, 14 Walton Road, Bangalore 560001 (hereinafter) referred to as "L-1 India", a subsidiary of L-1 identity Solutions Operating Company, a Delaware U.S.A. corporation (Identified in Purchaser's Bid Document as the "Prime Consortium Member" and "Prime Bidder" and hereinafter referred to as "Biometric Solution Provider" or "BSP"), which expression shall unless repugnant to the context or meaning thereof mean and be deemed to include its successors and permitted assigns of the other part.

//TRUE TYPED COPY//

18

<http://www.thehindu.com/opinion/op-ed/to-pass-biometric-identification-apply-vaseline-or-boroplus-on-fingers-overnight/article4200738.ece>

**OPINION » COMMENT**

December 15, 2012

Updated December 17, 2012 01:54:15 IST

## To pass biometric identification, apply Vaseline or Boroplus on fingers overnight

3 BHK in Bangalore - Launching 3 SHK at Parkwest Emerald By Shapoorji Pallonji in  
Sinnypetewww.parkwest.co.in

the hindu

ANUMILHA YADAV

[COMMENT \(1\)](#) [PRINT](#) [I](#)

inShare2

18



A Banking Correspondent makes pension and MNREGA payments to beneficiaries in Dohakatu village in Ramgarh district adjoining Ranchi. Photo: Manob Chowdhury

## DIRECT CASH TRANSFER, WHAT AND HOW?

- Welfare payments will be made directly to bank accounts of beneficiaries
- Eliminate leakage, claims government
- Set for launch in 51 districts across India early next year
- 80% of population in each district should have Aadhar cards to kickstart scheme
- Bank accounts need to be opened for all beneficiaries
- Accounts linked with Aadhar numbers of individuals
- Beneficiaries will get payment if their fingerprints, Iris match with UIDAI database



## JHARKHAND EXPERIENCE, A YEAR AFTER LAUNCH OF PILOT PROJECTS

- In Ramgarh district 40% enroll in Aadhar
- 2% in district have Aadhar-linked accounts
- 3% of target for MGNREGA payments reached in the state
- Not enough bank branches to open accounts
- Not all account holders have got passbooks
- Biometrics don't match for half of beneficiaries, typically
- Poor internet connectivity

UPSC  
politics  
government  
interior policy

social issue  
welfare

Technical glitches that plague cash transfers in India have arisen from a simple problem that does not need Internet.

Pilot cash transfer projects taken up in Jharkhand for MGNREGA wages have achieved little success due to a variety of logistical, human and technological problems. A year after the launch of these projects, the problems remain unsolved.

In Ramgarh district, a majority of the beneficiaries are in Dohakatu and Marar panchayats of Ramgarh block. Over 63,000 people enrolled for Aadhaar numbers in the two panchayats in Ramgarh block. Of these, only 2,312 were "mapped", i.e., their Aadhaar numbers and their welfare details were linked together. Of 4,791 "active" job-card holders in the two panchayats, only 469 received MGNREGA payments through Aadhar-Enabled Cash Transfers (AECTs). Fifty km away in Ratu block in Ranchi, of 8,231 "active" job-card holders in three panchayats, those paid through AECTs was even lower: 162.

Under strain

Ramgarh District Collector Amitabh Kaushal, who has been awarded the National Aadhaar Governance Award two years in a row, admits that the district's administrative capacity is under strain and banks are not able to cope with the volume of transactions. Of eight banks on the Aadhaar platform, five got added only last month.

In Ramgarh and Ranchi, all accounts have so far been linked with the service area bank, Bank of India. "Initially many people turned up to enrol without their MGNREGA job-cards. So now we have to physically go house to house to find every job-card holder. In some places there was high enrolment but no BoI branch, in other places a branch existed but little enrolment," says Mr. Kaushal. He rattles off a list of other concerns — bank technology upgrading, Internet connectivity in hilly areas, and availability, security and integrity of the cash-carrying Banking Correspondents (BCs).

At the Panchayat Bhavan at Dohakatu where most of the MGNREGA payments recorded were made, the BC, Rajesh Kumar, tries to rush through filling beneficiaries' bank forms online — he has been asked to submit them by December 15 — but runs into many interruptions. "The line [power] came back only at noon. Last week two days there was no power and then there were server problems," he says. But at three p.m., when he begins making payments to those who have queued up to collect wages for land-levelling work done under MGNREGA in November, there is anxiety but palpable excitement too.

### Disappointments

Of the seven workers who take turns to scan their fingers, the micro-ATM Mr. Kumar operates recognises four. He pays them between Rs. 300-200 from the cash he withdrew at the bank that morning. For two workers the micro-ATM lists errors repeatedly. One worker's account has still not been mapped. Of four pension beneficiaries who turn up, three collect their payments within an hour.

Dashay Bediya, a frail agricultural worker in a white shirt and dhoti, tries eight times, placing different fingers in the hope that one will work and then goes outside the office and scrubs his hands. He returns and tries five times more getting more anxious and disappointed each time. "Come after three to four days. Put Vaseline or Boroplus and rub your fingers before you go to sleep," Mr. Kumar instructs before sending him back. And so the question, can the ease of payments at the household or panchayat level not be better achieved through smart cards that require neither real-time Internet connectivity, nor the creation of a massive centralised database like UIDAI's that makes it harder to include those who missed enrolment the first time?

Dohakatu has had such a bevy of bureaucrats, officials and journalists visiting for months that the sarpanch, Kalawati Devi, now keeps a stock of mineral water bottles at the Panchayat Bhavan. At the site of the second pilot in Ratu block, however, things have not gone so smoothly even during officials' visits. A few days before October 2 when the Chief Secretary of Jharkhand was to hand over pensions through AECTs at a function at Tigra panchayat, block officials and BCs tried frantically to make the fingerprints verification go through for 45 beneficiaries. It worked only in the case of nine.

Since October 2, even these nine have not been paid through AECTs even once, their payments still going to their old post-office accounts. The only reason they are still able to get their pensions is that

the government kept open the option to withdraw the money at the post-office using their old passbooks.

“Half of MGNREGA workers’ fingerprints do not match. Maybe their fingerprints keep changing? In March I gave pension beneficiaries ID proofs to BoI so they open accounts and give passbooks. Then the bank manager changed in June and bank officials say they lost the documents. I gave the documents again in September but everyone is still waiting for passbooks,” says Tulsi Koeri, the BC in Puriyo panchayat, Ranchi.

The BC in nearby Tigra panchayat, Mahmood Alam, says of 383 whose MGNREGA accounts were mapped with Aadhaar since last December, only 102 have got passbooks, making it difficult for them to withdraw wages if they run into authentication or Internet connectivity problems.

### Missing wages

Neither Mr. Koeri, nor Mr. Alam has been paid their monthly salary of Rs. 2,100 since they were hired as BCs last November by United Telecoms Limited (UTL) that BoI outsourced the work to. Mr. Kumar, Ramgarh’s BC, got paid for four months after the Collector, Mr. Kaushal, intervened in June. Even he has not been paid the last six months.

“I spend at least Rs. 400 per month on fuel for this work. In October at the PM’s video conference three of us were sent from Ratu, we paid over Rs. 2 lakh those three days. There have been 18-20 functions with officials from Delhi, Bangalore, even America. But if I ask for wages, UTL says if you do not like the work you can quit. Could you ask them about our wages please?” asks Mr Koeri.

*anumeha.y@thehindu.co.in*

Annescure RA-3

440

Opinion )) Comment

December 15, 2012

Updated December 17.2012 01:54 IST

DT. 15-12-2012

To pass biometric identification, apply Vaseline or Boroplus on fingers overnight

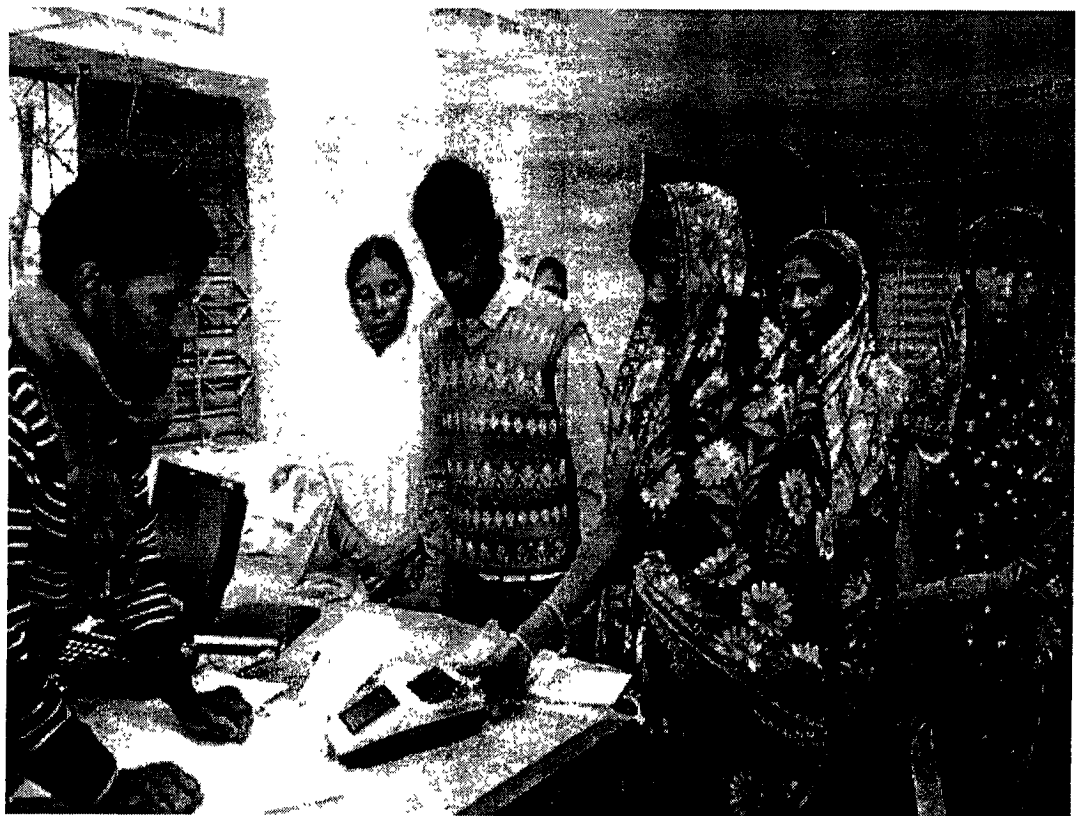
3 BHK in Bangalore – Launching 3 BHK at Parkwest Emerald by Shapoorji Pallonji in Binnypete  
[www.parkwest.co.in](http://www.parkwest.co.in)

• ANUMEHA YADAV

COMMENT (1) · PRINT · T T

[inShare2](#)

18



A Banking Correspondent makes pension and MNREGA payments to beneficiaries in Dohakatu village in Ramgarh district adjoining Ranchi. Photo: Manob Chowdhury

//TUE TYPED COPY//



**MOST IMMEDIATE**

Government of India  
NITI Aayog (National Institution for Transforming India)  
Unique Identification Authority of India

Regional Office, Lucknow

दिनांक: 24.6.2015

सं-ए-11018/01/13/आर०टी०आई०-वॉल्यूम-V/यूआईडीएआई/लखनऊ /1332(हि)

To,

Sh Mathew Thomas  
18-A, Adarsh Vista, Basavnagar, Marathalli PO  
Bangalore-560037

Annexure RA-4

441

विषय: जनसूचना अधिकार अधिनियम -2005 के अंतर्गत प्रार्थना पत्र ।

महोदय,

उपरोक्त विषय में आपके आवेदन के सन्दर्भ में आपको बिन्दुवार सूचित करना है कि :

S.no.	मांगी गई सूचना	उपलब्ध अभिलेखों के आधार पर सूचना
a	Please inform whether any internal inquiries have been conducted by UIDAI into several reports in media and FIRs filed in police station on frauds and other misdemeanours in enrolment in the UID/ Aadhaar Scheme?	YES
b	If so what are the result / conclusions of such inquiries?	Depending upon nature of complaint appropriate action is taken against operator/Enrolment Agency.
c	If no such inquiries have been conducted, please state the reasons for not doing so under section 4 (1)(d) of the RTI act, 2005	Not Applicable
d	Any document and/or policy, procedure, protocol or rules regarding action to be taken in the event of any fraud or violation of laid down procedures for enrolment under UID/ Aadhaar Scheme	Actions are being taken under OM no. 4(4)/57/249/2014-E&U dated 20.08.2014 and OM No. 4(4)/57/249/2014-E&U dated 08.04.2015 issued from UIDAI HQ
e	Any document giving <u>actions taken</u> , including and also apart from, terminating and / or suspending enrolment agency's empanelment, and result thereof on fraud and other misdemeanours reported during enrolment at various enrolment centers across the country and <u>wherein FIRs have been filed in police station</u> .	
f	Any document giving <u>actions taken</u> , (including and also apart from, terminating and / or suspending enrolment agency's empanelment) and result thereof on fraud and other misdemeanours reported during enrolment at various enrolment centers. (Wherein no FIR may have been filed) but have been expose din sting operations by 'Headlines Today TV and Cobra Post'	Not Applicable to RO Lucknow
g	Any document giving details of changes in enrolment procedure instituted as a result of the above action and / or internal inquiries in order to prevent the types of frauds and misdemeanour reported and detected as above	Not Applicable

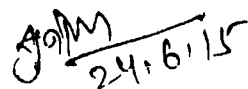
इस कार्यालय द्वारा दी जा रही सूचना से असंतुष्टि की दशा में आप सूचना अधिकार नियम अंतर्गत निम्नलिखित प्रथम अपीलीय अधिकारी को इसी कार्यालय में अपील कर सकते हैं-

श्री सी.एस.मिश्र,

सहायक महानिदेशक एवं प्रथम अपीलीय अधिकारी,

भारतीय विशिष्ट पहचान प्राधिकरण, क्षेत्रीय कार्यालय, लखनऊ ।

भवदीय,



(सुनील कुमार पाण्डेय)

उपनिदेशक एवं केन्द्रीय जनसूचना अधिकारी

Copy to

1. Sri S S Bisht, Section Officer (F&U), UIDAI, UIDAI Headquarters, 2<sup>nd</sup> Floor - Tower-1, Jeevan Bharti Building, Connaught Circus, New Delhi - 110001 w.r.t (Case No 596-598) Letter no 4(4)/57/222/2015-F &U Dated 16<sup>th</sup> June, 2015

नमिस्तर आभारक प्रक्रिया पूर्णतः निःशुल्क है नमिस्तर हमें पैसा को भुगतान करने की आवश्यकता नहीं है।



पता: 2/46 V मोन नगर, गोरखपुर, उत्तर प्रदेश - 226010  
TC-46-V 3 Floor, Vibhuti Khand Gornli Nagar Lucknow - 226010  
Website: <http://www.uidai.gov.in>

Annexure RA-4

442

**Most Immediate**

Government of India

NITI Aayog (national Institution for Transforming India)

Unique Identification Authority of India

Regional Office, Lucknow

No. A-11018/01/13/R.T.I. -/UIDAI/Lucknow/1332(h)

Date: 24.06.2015

To,

Sh. Mathew Thomas

18-A Adarsh Vista, Basavnagar,

Marathalli P.O. Bangalore-560037

Sub: Application Under RTI Act, 2005

Sir,

You are informed pointwise in respect of your Application on the subject:

S.No.	Information Sought	Information on the basis of records available
3/a	Please inform whether any internal inquiries have been conducted by UIDAI into several reports in media and FIR's filed in police station on frauds and other misdemeanors in enrolment in the UID/Aadhaar Scheme?	yes

b	If so, what are the result/conclusions of such inquiries?	Depending upon nature of complaint appropriate action is taken against operator/enrolment Agency
c.	If no such inquiries have been conducted, please state the reasons for not doing so under section 4 (1) (d) of the RTI act, 2005	Not Applicable
d.	Any document and/or police procedure, protocol or rules regarding action to be taken in the event of any fraud or violation of laid down procedures for enrolment under UID/Aadhaar Scheme.	Action are being taken under OM no. 4 (4)/57/249/2014-E & U dated 20.08.2014 and Om No. 4 (4)/57/249/2014-E&U dated 08.04.2015 issued from UIDAI HQ.
f	Any document giving actions taken, including and also apart from, terminating and/or suspending enrolment agency's empanelment, and result therefore on fraud and other misdemeanours reported during enrolment at various enrolment centers across the	Not Applicable to RO Lucknow

	country and wherein FIRs have been filed in police station.	
g.	Any document giving details of changes in enrolment procedure instituted as a result of the above action and/or internal inquiries in order to prevent the types of frauds and misdemeanor reported and detected as above.	Not Applicable

In case of dissatisfaction from the information being given by this office, you may file an Appeal under Right to Information Act, 2005 before the First Appellate Officer of this Officer.

Shri C.S. Mishra

Assistant Director General and First Appellate Officer  
Indian Unique Identification Tribunal, Zonal Office,  
Lucknow.

Yours faithfully

Sd/- 24.06.2015

(Sunil Kumar Pandeya)

Dy. Director and Central Public Information Officer

Copy to:

1. Sri S. S. Bisht, Section officer (E & U), UIDAI, UIDAI Headquarter, 2<sup>nd</sup> Floor, Tower- I, Jeevan Bharti Building, Connaught Circus, New Delhi-110001 w.r.t. (Case No. 596-598) Letter No-4 (4)/57/222/2015-E & U Dated. 16<sup>th</sup> June, 2015.

//TRUE TYPED COPY//

Annexure RA/5

445

## इंडियन ऑयल कॉर्पोरेशन लिमिटेड

प्रधान कार्यालय

इंडियन ऑयल भवन, जी-9, अली यावर जग मार्ग,  
बान्द्रा (पूर्व), मुंबई 400 051

**Indian Oil Corporation Limited**

Head Office

Indian Oil Bhavan, G-9, Ali Yavar Jung Marg,  
Bandra (East), Mumbai - 400 051

☎ 022-26447926, 26447025



**IndianOil**  
A Maharatna  
Company

### विपणन प्रभाग

#### Marketing Division

PLNG/RTI/5424

06.12.2013

Shri Mathew Thomas,  
18 A, Adarsh Vista,  
Basavanagar,  
Bangalore - 560037

#### **Sub: Information sought under RTI Act 2005 - Your application dated 10.10.13**

Sir,

This has reference to your application dated 10.10.2013, forwarded to us by PIO, Ministry of Petroleum and Natural Gas vide letter under reference 30044/2013-LPG dated 26.11.13 and received by us on 29.11.2013. Our reply is provided hereunder :

#### **Point a to f :**

You have sought the same information vide your earlier two RTI applications dated 10.10.13 (one received directly and the other through MoP&NG), which have already been replied vide our letter under reference PLNG/RTI/5127 dated 23.10.13 and 18.11.13 respectively. You may kindly be guided by the said replies. Kindly note that only the same consumer having multiple connections has been detected while such customers linked their Aadhaar numbers w.r.t their connections with the distributors.

#### **Point g:**

There is no such document available with IOCL.

However, for your information, LPG distributors/IOCL are not required to authenticate the identity of customer at the time of delivery of cylinders. LPG connection is released on submission of Proof of Identity (POI) and Proof of Address (POA) while completing KYC formalities. The prospective customer has to submit undertaking also that if it is found that the declaration / information given in the application or any documents submitted in support of identity/ residence proof is untrue or false or incorrect, IOCL would have the right to withdraw the supply of gas / terminate the connection / seize the equipment and forfeit the security deposit and the customer has no claim what so ever against oil companies/distributors for such withdrawal / termination / seizure/ forfeiture.

The onus is on the customer to prove his identity / residential status, if questioned by any authority.

446



IndianOil  
A Maharatna  
Company

**Point h:**

There is no such document available with IOCL.

However, you may refer to "The interim report of task force on direct subsidy transfer for LPG, kerosene and fertilizers" detailing on the subject, which is available in the public domain of Ministry of Finance, Government of India : [www.finmin.nic.in](http://www.finmin.nic.in).

The particulars of Appellate Authority appointed under the Act, is given below. The period of Appeal is within 30 days of receipt of this communication.

Shri H S Bedi  
Appellate Authority & Executive Director(HR), HO  
Indian Oil Corporation Ltd.(Marketing Division)  
Indian Oil Bhavan, G-9, Ali Yavar Jung Marg,  
Bandra (E), Mumbai-400051

Thanking you,

Yours faithfully,  
for Indian Oil Corporation Ltd.

A handwritten signature in black ink, appearing to read "A. S. N. Sarma".

(A.S.N.Sarma)  
General Manager (Planning) /  
Public Information Officer

Annexure RA-5 447

INDIAN OIL CORP. LTD.

Head Office

Indian Oil Bhavan, G-9,

Ali Yavar Jung Marg, Bandra (East),

Mumbai - 400 051.

Ph. No. 022-62447926, 2644725

Marketing Division

PLNG/RTI/5424

Shri Mathew Thomas,

18A, Adarsh Vista,

Basavanagar,

Bangalore-560037

Date - 6.12.2013

Sub : Information sought under RTI Act 2005-

Your application dated 10.10.2013

Sir,

This has reference to your application dated 10.10.2013, forwarded to us by PIO, Ministry of Petroleum and natural gas. Vide letter under reference 30044/2013-LPG dated 26.11.2012 and received by us on 29.11.2013. Our reply is provided hereunder :

Point a to f :

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PLNG/RTI/5127 dated 23.10.2013 and 18.11.2013 respectively. You may kindly be guided by the said replies. Kindly note that only the same consumer having multiple connections has been detected while such customers linked their Aadhaar numbers w.r.t. their connections with the distributors.

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However for your information, LPG distributors/IOCL are not required to authenticate the identity of customer at the time of delivery of cylinders. LPG connection is released on submission of proof of identity (POI) and proof of address (POA) while completing KYC formalities.

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The onus is on the customer to prove his identity/residential status, if questioned by any authority.

Point H :

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However, you may refer to The interim report of task force on direct subsidy transfer for LPG, Kerosene and fertilizers” detailing on the subject, which is available in the public domain of Ministry of Finance, Government of India : [www.finmin.gov.in](http://www.finmin.gov.in)

The Particulars of appellant Authority appointed under the Act, is given below, the period of Appeal is within 30 days of receipt of this communication.

Shri H S Bedi  
Appellant Authority & Executive Director (HR), HO  
Indian Oil Corporation Ltd. (Marketing Division)  
Indian Oil Bhavan, G-9, Ali Yavar Jung Marg,  
Bandra (E), Mumbai-400051

Thanking You,

Yours faithfully,  
For Indian Oil Corporation Ltd.

Sd/-  
(A.S.N. Sarma)  
General Manager (Planning)/  
Public Information Officer

//TRUE TYPED COPY//

Annexure RA-6

450

14

इंडियन ऑयल कॉर्पोरेशन लिमिटेड

प्रधान कार्यालय

इंडियन ऑइल भवन, जी-9, अली यावर जंग मार्ग,  
बान्द्रा (पूर्व), मुंबई 400 051

Indian Oil Corporation Limited

Head Office

Indian Oil Bhavan, G-9, Ali Yavar Jung Marg,  
Bandra (East), Mumbai - 400 051

☎: 022-26447926, 26447125



**IndianOil**  
A Maharatna  
Company

विपणन प्रभाग

Marketing Division

REGD AD

Ref: PLNG/RTI / 7705

25/06/2015

Shri Mathew Thomas,  
18 A, Adarsh Vista,  
Basavanagar, Marathahalli PO,  
Bangalore - 560037.

Sir,

**Sub: Two verbatim RTI applications dated 14.05.15 under RTI Act, 2005.**

This has reference to your two verbatim applications dated 14.05.15, one is addressed to PIO, HO, IOCL and the other is addressed to PIO, Ministry of Petroleum & Natural which was forwarded to us vide letter no. 16647/2015-LPG/2015 dated 04.06.15. The applications were received by PIO on 27.05.15 & 09.06.15 respectively.

**Reply :**

You have already raised same queries on "Leakage of subsidy" vide your earlier applications dated 04.06.13 (directly & through MOP), 11.07.13, 27.11.13 & 08.01.14 (directly & through MoP) and also raised similar queries vide your several earlier RTI applications.

We reiterate that "Leakage of subsidy" is not clear. However, no estimate regarding quantum of use of subsidized cylinders by commercial establishments is maintained by IOCL

The particulars of 1<sup>st</sup> Appellate Authority are given below. As per the provisions of the RTI Act-2005, the period of appeal is 30 days from the date of receipt of this communication

Shri. H. S. Bedi  
Appellate Authority & Executive Director (I/C-HR), HO  
Indian Oil Corporation Ltd (Mktg Division), Indian Oil Bhavan,  
G-9, Ali Yavar Jung Marg, Bandra (E), Mumbai-400051

Thanking you.

Yours faithfully,  
For Indian Oil Corporation Ltd.

Aparna Asthana

PIO / GM (Planning)

451.  
Annexure RA-6

Public information Officer,  
Head Office, (Marketing Division),  
Indian Oil Corp. Ltd.  
Indian Oil Bhavan, G-9,  
Ali Yavar Jung Marg, Bandra  
(East),  
Mumbai - 400 051.  
Ph. No. 022-26447926, 26447125

Marketing Division

25.06.2015

REGD AD

Ref : PLNG/RTI/7705

Shri Mathew Thomas.

18 A, Adarsh Vista,

Basavanagar, marathahalli PO,

Bangalore - 560037,

Sir,

Sub : Two verbatim RTI applications dated 14.05.2015,  
under RTI Act, 2005.

This has reference to your two verbatim applications  
dated 14.05.2015, one is addressed to PIO.HO.IOCL and  
the other is addressed to PIO, Ministry of Petroleum &  
Natural which was forwarded to us vide letter No.  
16647/2015-LPG/2015 dated 04.06.15. the applications  
were received by PIO on 27.05.2015 & 09.06.2015  
respectively.

Reply :

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You have already raised same queries on Leakage of subsidy" vide your earlier applications dated 04.06.2013 (directly & through MOP). 11.07.2013, 27.11.2013 & 08.01.2014 (Directly & through MoP) we reiterate that "Leakage of subsidy "is not clear, however, no estimate regarding quantum of use of subsidized cylinders by commercial establishments is maintained by IOCL.

The particulars of 1<sup>st</sup> Appellants Authority are given below. As per the provisions of the RTI Act-2005, the period of appeal is 30 days from the date of receipt of this communication.

Shri. H. S. Bedi  
Appellant Authority & Executive Director (I/C-HR). HQ  
Indian OIL Corporatio Ltd (Mktg Division). Indian Oil  
Bhavan,  
G-9, Ali Yavar Jung Marg Bandra (E), Mumbai-400051  
Thanking you.

Yours faithful  
For Indian Oil Corporation Ltd.

Sd/-  
Aparna Asthana  
PIO/GM (Planning)

//TRUE TYPED COPY//

Annexure RA/7

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15

LSE Research Online

Press release



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Department of Information Systems

An assessment of the UK Identity Cards Bill and its  
implications : ID Cards - UK's high tech scheme is  
high risk

Published 27 June 2005

The Identity Project © 2005 Department of Information Systems, London  
School of Economics and Political Science. <http://is2.lse.ac.uk/idcard/>

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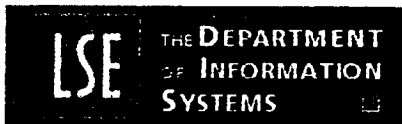
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## The Identity Project

Press release on the launch of report of *The Identity Project: an assessment of the UK Identity Cards Bill and its implications*

# ID Cards - UK's high tech scheme is high risk

Published 27 June 2005

[Download the full report \(approx 300 pages\)](#)  
[Download the executive summary](#)

The likely cost of rolling out the UK government's current high-tech identity cards scheme will be £10.6 billion on the 'low cost' estimate of researchers at the London School of Economics and Political Science (LSE), without any cost over-runs or implementation problems. Key uncertainties over how citizens will behave and how the scheme will work out in practice mean that the 'high cost' estimate could go up to £19.2 billion. A median figure for this range is £14.5 billion.

If all the costs associated with ID cards were borne by citizens (as Treasury rules currently require), the cost per card (plus passport) would be around £170 on the lowest cost basis and £230 on the median estimate. The Annex (below) shows where LSE expects costs to be incurred and the 'Top Ten Uncertainties' about the project as currently planned.

The LSE report *The Identity Project: an assessment of the UK Identity Cards Bill and its implications* is published today (27 June) after a six month study guided by a steering group of 14 professors and involving extensive consultations with nearly 100 industry representatives, experts and researchers from the UK and around the world. The project was co-ordinated by the Department of Information Systems at LSE.

The LSE report concludes that an ID card system could offer some basic public interest and commercial sector benefits. But it also identifies six other key areas of concern with the government's existing plans:

**Multiple purposes** Evidence from other national identity systems shows that they perform best when established for clear and focused purposes. The UK scheme has multiple rather general rationales, suggesting that it has been 'gold-plated' to justify the high tech scheme. For example, the government estimates that identity fraud crimes may cost up to £1.3 billion a year, but only £35 million of this amount can be addressed by an ID card.

**Will the technology work?** No scheme on this scale has been undertaken anywhere in the world. Smaller and less ambitious schemes have encountered substantial technological and operational problems that are likely to be amplified in

a large-scale national system. The use of biometrics creates particular concerns, because this technology has never been used at such a scale.

**Is it legal?** In its current form, the Identity Cards Bill appears to be unsafe in law. A number of elements potentially compromise Article 8 (privacy) and Article 14 (discrimination) of the European Convention on Human Rights. The government may also be in breach of law by requiring fingerprints as a pre-requisite for receipt of a passport. The report finds no clear case why the ID card requirements should be bound to internationally recognized requirements on passport documents.

**Security** The National Data Register will create a very large data pool in one place that could be an enhanced risk in case of unauthorized accesses, hacking or malfunctions.

**Citizens' acceptance** An identity system that is well-accepted by citizens is likely to be far more successful in use than one that is controversial or raises privacy concerns. For example, it will be critical for realizing public value that citizens want to carry their ID cards with them and to use them in a wide range of settings.

**Will ID cards benefit businesses?** Compliance with the terms of the ID cards Bill will mean even small firms are likely to have to pay £250 for smartcard readers and other requirements will add to the administrative burdens firms face.

The LSE report concurs with 79 out of the 85 recommendations made by the House of Commons Home Affairs Committee in its report on the draft Identity Cards Bill. Following up suggestions there and coming from industry and academic experts, the LSE team also set out an alternative ID card scheme that would still incorporate biometrics, but would be simpler to implement and radically cheaper. The LSE alternative ID card would also give citizens far more control over who can access data about them, and hence would be more likely to win positive public and industry support.

Dr Gus Hosein, a fellow in the Department of Information Systems at LSE, said: 'We have proposed an alternative model that we believe to be cheaper, more secure and more effective than the current government proposal. It is important that Parliament gets the chance to consider a range of possible models before the ID Cards Bill is passed. Even if government figures were correct, the costs of the government scheme are disproportionately higher than the scheme's ability to protect the UK from crime, fraud or terrorism.'

Professor Patrick Dunleavy, Professor of Political Science and Public Policy at LSE, said: 'This report is not an argument for or against ID cards, but an impartial effort to improve the evidence base available to Parliament and the public. The Home Office currently officially suggests that ID cards will cost around £6 billion to implement over ten years, but it has not yet justified this estimate in detail. By contrast, we recognize considerable uncertainties ahead with such a novel, high tech scheme and we show how these uncertainties might affect costings.'

Ends

Contact.

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## Notes:

The LSE report includes a preface by Information Commissioner Richard Thomas. He writes: 'I welcome the report commissioned and undertaken by the LSE as a valuable contribution to an issue which engages significant data protection and privacy concerns. I have expressed my unease that the current proposal to establish a national identification system is founded on an extensive central register of personal information controlled by government and is disproportionate to the stated objectives behind the introduction of ID cards.'

'The report makes clear that a system which minimises the amount of personal information generated and held by the government on card holders can be established without sacrificing the essential attributes of security, reliability and trust in the system. I hope that during the scrutiny of the ID Cards Bill, as it passes through the parliamentary process, this report helps focus debate on the actual system for administering ID cards and the need to ensure that this is one which is proportionate to the reasons for wishing to introduce ID cards.'

Annex: showing Costs breakdown and 'Ten Key Uncertainties'

**ANNEX****Where costs will arise in the ID Cards Project over ten years**

	Low costs estimate £ million	Median estimate £ million	High costs estimate £ million
Issuing passports (based on Passport Service data)	3,936	3,936	4,065
Managing the National Identity System	2,261	3,658	5,341
Designing and constructing the National Identity Register and adapting 'first round' government computer systems	1,559	2,169	2,910
Staff costs and training	1,719	3,368	5,308
Direct costs of issuing Identity Cards	814	1,015	1,216
Providing ID card readers for public sector bodies (as specified in the Bill)	291	306	317
Miscellaneous	22	64	117
<b>TOTAL</b>	<b>10,602</b>	<b>14,516</b>	<b>19,274</b>

Note: We assume that over ten years 67.5 million people (UK citizens plus EU nationals living in the UK) will be covered by the scheme. Some costs (for example, for issuing cards) could be higher (or lower) if more (or less) people needed to be covered.

The LSE estimates include the costs of 'pulling' information from other government computers needed for verifying people's identities, and of 'pushing' ID card data to Home



Office databases, police databases and the Department of Work and Pensions. But they exclude the costs of adapting the full range of other government computer systems to use ID card data (likely to be substantial), nor the costs that will accrue to the private sector

### **Ten Key Uncertainties over the ID card project**

All data relate to the first ten years operation

#### **The ID cards themselves**

##### **1. How much will the scheme cost the UK?**

Our 'best case' scenario is that it will cost around £10.6 billion (very roughly £170 per card and passport) though some of this cost may be absorbed into government budgets and passed on through tax. If the scheme is fully integrated into government IT systems this cost may increase considerably. Worst case: 19.2 billion, with a proportionately higher unit price per person.

##### **2. How often will the cards or the biometrics on them need to be renewed?**

Best case: once in 10 years for everyone. Worst case: once in five years for everyone. Median: some people (for instance, some elderly or ill people) will need to renew their biometrics every 5 years or more; some others will need to renew cards because of personal circumstance changes; but other people can go 10 years.

##### **3. How often will ID cards be lost or damaged and need to be replaced?**

Best case: Loss and damage will be the same as for passports. Worst case: More problems than with passports because ID cards are in use much more.

#### **The ID card service**

##### **4. How difficult will it be to initially enroll people on the ID card scheme?**

Best case: People flock to enroll speedily and there is no tail-end of resisters. Worst case: People need extensive chasing, some people resist cards to the end, and enrollment is slow.

##### **5. How straightforward is it to verify people's identities and to enforce compliance with ID cards? How costly will it be to make corrections and re-enroll people in the ID card scheme?**

Best case: No verification problems, few corrections, simple re-enrollment. Worst case: Significant problems with verifications, more corrections, difficulties checking other databases; enforcement is more costly because of citizen resistance, and re-enrollment is somewhat more complex

#### **Public affairs aspects**

##### **6. To what extent will the public accept the government's proposals?**

Best case: people come to embrace the government's scheme, seeing benefits in having an ID card backed by a Register. Worst case: a mass campaign of non-cooperation that creates unbearable pressures on the system with consequent financial cost.

##### **7. To what extent will there be civil liberties and privacy implications in the scheme?**

Best case: government is able to maintain strict protection of data on the register. Cards use secure technologies to limit the threat of data misuse. Worst case: the scheme suffers

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from "function creep" to the extent that a card becomes an internal passport without which a person cannot function.

**8. Will disabled people suffer hardship and discrimination through the system's operation?**

Best case: government recognizes the challenges that face many disabled people in relation to biometrics, and incorporates technology to meet and support these problems.  
Worst case: to rein in costs the government buys cheap technology that inherently disadvantages disabled people, resulting in severe day-to-day problems for them, for instance, possible denial of service and loss of dignity.

**Security**

**9. Are there any security concerns about the system?**

Best case: the security of personal data remains much as it is in the current environment.  
Worst case: if intruders or hackers could compromise security, then large numbers of identity records are at risk..

**10. Is there a risk that new kinds of ID fraud could arise from cards coming into pervasive use?**

Best case: No new ID fraud. Worst case: Some new, high tech ID fraud develops, with greater costs for those citizens affected. Successful identity theft of a person's biometric data would mean that their fingerprints or iris scans are permanently in the hands of criminals, with little hope of revoking them.s

27 June 2005

Identity project homepage

**LSE RESEARCH ONLINE**

**Press release**

**Department of information systems**

An assessment of the UK identity Cards Bill and its implications : ID Cards – UK's High tech scheme is high risk

Published 27 June 2005

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## Biometric identification device specification and actual performance considered for the operations of the UIDAI

Hans Varghese Mathews

**Abstract** Mistaken identification is a particular problem in the biometric identification of a large population. The chance of mistaken identification, which is the conditional probability that individuals are different even though their biometrics match, will increase as more and more individuals are identified. The Government of India is currently engaged in biometrically identifying its more than 1 billion citizens, and we find that the probability of mistaken matches will increase considerably between the initial and final stages of the exercise. Here are some indicative estimates: that probability is expected to increase from 0.006776 in the first 10 million identified to 0.618596 in the last 10 million, and from 0.064096 in the first 100 million identified to 0.609574382 in the last 100 million. The actual number of matches that will occur in the final stages is not negligible: 1,280,208 matches are expected for the last 100 million identified, and 780,382 of these will be mistaken matches. The work to be done in deciding when a match is mistaken will depend on how many previously identified persons a given individual is matched with. We are able to conclude in the case at hand that only rarely will there be more than one such matching person. Biometric devices may not perform as well in the field as they do in the laboratory when they are employed for the rapid identification of a large population. The accuracy of a device is measured as the probability that a match will occur between two randomly chosen individuals. Manufacturers of devices specify accuracy through laboratory estimates, and for the suite of devices being used by the Government of India we estimate that accuracy in the field is six-fold lower than accuracy in the laboratory.

### 1 Introduction

The Unique Identity Authority of India, the UIDAI for short, is currently engaged on the biometric identification of the entire population of India. In what follows we shall be attempting an assessment of that ongoing exercise: and our primary concern is to appropriately assess the actual performance of the identification procedure, in the field, against such performance as might be expected from the technical specifications of the devices being used and the matching protocol that is being followed. In the next section we shall say more precisely what a *biometric* is, make explicit the relevant technical specifications of the devices that produce them, say exactly what *matching* amounts to, and then derive, from all this, the particular measures we shall need for our operational assessment. We begin with our findings.

#### 1.1 Summary of findings

A biometric device intended for the identification of individuals is supplied with a specified error rate: an experimental estimate of the probability that the bio-

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metrics of distinct individuals will match. When more than one device is used, and a suite of biometrics identifies an individual, the chance of such identification errors can be derived from the specified error rates of the individual devices: and for the matching protocol the UIDAI appears to be following we compute  $0.115512486 \cdot 10^{-11}$  as the specified *identification error*.<sup>1</sup> Manufacturers estimate error rates under laboratory conditions: when they are used for the rapid identification of a large population, as in our case, their performance in the field might fall short of what their specified errors promise: and we find that

- identification error in the field exceeds by a factor of 6, almost, the specified identification error for the UIDAI's matching protocol.

We are able to draw our conclusions by examining the result of an experiment performed by the UIDAI when 84 million citizens had been registered in their biometric database. The process of obtaining and storing biometrics is termed "enrollment" usually; and the stored suites of biometrics are called *templates*. The experiment estimated the chance of a false positive match: which occurs when the suite of biometrics of a new individual, one who is not actually enrolled, happens to match *some or other* stored template. The chance of a false positive match is the conditional probability, therefore, of a match occurring *given* that the individual is not enrolled, and it is called 'the false reject rate' usually. The rate depends on the number of individuals already enrolled. Write  $\phi(n)$  for the false reject rate when  $n$  individuals have been enrolled: the identification error is the chance, now, that the biometrics of a new individual will match *any one* given template, and we have  $\phi(n) = 1 - (1 - \xi)^n$  when  $\xi$  is the identification error. Now for a specified identification error of  $(0.1155001) \cdot 10^{-11}$  and an enrolled base of 84 million the false reject rate should be  $(0.97020084) \cdot 10^{-4}$  at most but the UIDAI got an estimate of  $(0.57725) \cdot 10^{-3}$  from its experiment. The bound on this rate comes from the relation  $1 - (1 - \xi)^n \leq n \xi$ , which holds for  $0 < \xi < 1$  generally, from this, and from the relation of  $\phi(n)$  to  $\xi$  just given, one can get the bounds

$$(1) \quad \phi(n)/n \leq \xi \leq -\log[1 - \phi(n)]/n$$

We have estimated the identification error in the field by using the UIDAI's experimental value as a reliable operational estimate of  $\phi(n)$  for  $n = 84$  million: and  $(0.687400801) \cdot 10^{-11}$  is our estimate of what  $\xi$  must be in the field.

The false reject rate is one measure of the operational accuracy, in the field, of a suite of biometric devices. A equally important measure is its converse: the conditional probability that an individual is not enrolled, actually, given a

<sup>1</sup> The UIDAI is using iris scanners and fingerprint scanners. It has made their specified error rates available to researchers at the Takshashila Institute, who have made them public. The specified error for their make of iris scanner is reported as  $1/13100$ , the specified error for the fingerprint scanner as  $1/500$ . The UIDAI has not published its matching protocol: but our investigations have led us to conclude the following: a match is taken to occur if both irises match and *any one* digit also does.

match between his or her biometrics and some or other stored template. We shall term this *mistaken identification* and our principal finding is that

- the probability of mistaken identification rises considerably between the initial and final stages of enrollment: by a factor of 10, almost, between the first and last tenths of the population enrolled.

We have proceeded by estimating the total number of matches expected, and the number of false matches among these, for successive millions of individuals enrolled for which we have used the lower of the bounds on  $\phi(n)$  given by

$$(2) \quad n \cdot \xi \cdot (1 - \xi) / (1 - \xi + n \cdot \xi) \leq 1 - (1 - \xi)^n \leq n \cdot \xi$$

The actual numbers are not negligible. For example, the UIDAI should expect 534,010 matches to occur for the first 100 million enrolled, out of which 34,180 will be false matches, but a total of 1,280,208 matches are expected for the last 100 million enrolled, and of these fully 780,382 would be false matches.<sup>2</sup>

When a match occurs the UIDAI must decide whether or not the individual is already enrolled, for which the templates matching that person's suite of biometrics must be examined. The amount of work here depends on how many templates will match a given suite of biometrics, generally, when a match does occur. We get an upper bound of 10,922,437 on the total number of matches when the entire population of 1.2 billion has been enrolled: of which 4,924,539 would be false ones. But we estimate that only 11,267,203 matching templates will have to be examined, at most, to decide which of these matches are false: and our last finding is that

- only rarely will more than one matching template have to be examined, when a match occurs, to see if the match is a false one.

Suppose  $n$  many are enrolled and  $\xi$  is the identification error: the computation requires an upper bound on the probability  $\psi_q(n)$  of finding  $q$  or more matching templates, for any  $q > 0$  now, should a false positive match occur: and we use

$$(3) \quad \psi_q(n) = 1 - \sum_{r=0}^{q-1} C_{n,r} \cdot \xi^r (1 - \xi)^{n-r} \leq [\xi^q / (q-1)!] \prod_{r=0}^{q-1} (n-r)$$

Here  $C_{n,r}$  counts the ways of choosing  $r$  objects out of  $n$  many. We have  $\psi_1(n) = \phi(n)$  of course, and the standard identification of  $\psi_q(n)$  with the value  $I_\xi(q, n - q + 1)$  of the Incomplete Beta Function yields this bound.

<sup>2</sup> The discrepancy is more extreme for small initial and final subsets: we estimate 50,325 matches for the first 10 million, of which only 341 would be false ones; but 131,050 matches are expected for the last 10 million, out of which 8,1607 would be false matches. The bounds on  $\phi(n)$  come from Professor Nico Temme of the CWI in The Netherlands: whose help we gratefully acknowledge. To count matches and mistaken matches one needs, besides identification error, the chance that enrolled individuals will try to register again, and the chance of a match for an already enrolled person. The UIDAI has conducted an experiment which estimates the latter, and it has estimated to its satisfaction the former as well.

## 1.2 A further consideration

The biometric identification of a large population is complicated by the following circumstance: enrollment will have to be conducted through several venues simultaneously. We must distinguish here between different *instances* of a given biometric device. Each venue will be served by one instance of each device being used, and a biometric obtained from one venue, with one instance of a particular device of some make and specification, will have to be matched against the biometrics obtained from every other venue with other instances of the same device. The requirement now is that all *instances* of a device, of a given make and specification, be *operational clones* of each other. Section 4 specifies conditions that operational clones must satisfy, and considers briefly how they might be practically met; but for lack of data we cannot gauge how well the UIDAI's operations might meet the requirement.

## 2 Quantitative preliminaries

A biometric is a numerized representation of some generic physical or physiological feature of an organism. For precision and brevity we shall call such a feature an *organic object*, using the word "object" in a less than daily way. The numerized representation is typically a real or binary vector: which must be of suitably large dimension if the biometric is to be used for the *identification of organic individuals*. We shall only be considering such identificatory biometrics. A device or arrangement for obtaining these numerized representations will first *scan* the organic object in some way: and it is important to keep in mind that *a biometric is always the output that a particular device produces when it is given as input an organic object of the sort it was designed to scan*. The crucial circumstances now are:

- a the numerized representations obtained from any two scans of the same organic object are almost never *precisely* the same;
- b specifying *in advance* how numerized representations of different organic objects will themselves differ, with any exactitude, seems impossible.

These inconvenient imprecisions arise in two ways: from unavoidable variations in the physical process of scanning, first, and then from the peculiarities of whatever algorithm converts the *signal* or *image* produced by scanning into a numerized representation. The circumstance (a) allows the *identification error* already noted: because the numerized representations of two distinct organic objects may differ only as much as the representations produced by different scanings of one or other of those objects. The biometric produced from a particular scanning of an object may sometimes appreciably differ, as well, from some *identifying representation* produced from a prior scanning of that object: which may occasion what one might call *verification error*: and we shall specify both identification and verification error more precisely in a moment. So (a) necessitates the measurement of similarity and difference: one has to decide how

similar two biometrics must be in order to be accounted numerized representations of the same organic object; and how different they must be, conversely, to be accounted representations of different organic objects. The circumstance (b) ensures that these difficulties may be met in an empirical way only: measures or means to decide similarity and difference for the biometrics produced by a particular device can be obtained only by sampling its output.

One usually proceeds here by deciding on some suitable distance between the numerized representations that a device produces: upon which certain distributions of these distances are experimentally estimated. Let  $X^\delta$  denote the random variable whose values are distances between numerized representations of *distinct* organic objects: of which a random sample of  $C_{n,2}$  values may be obtained from  $n$  objects after scanning each once. Let  $X^\sigma$  denote the variable whose values are distances between different numerized representations of the *same* organic object: of which  $n$  values may be obtained upon scanning each object twice: though special care may have to be taken now to ensure that the sample is properly random. The primary requirement on the design of the device may now be stated thus: one must be able to find a number  $\tau$  such that the probabilities  $p[X^\delta < \tau]$  and  $p[X^\sigma > \tau]$  are both minuscule: the chance that a value of  $X^\delta$  lies below  $\tau$ , on the one hand, and the chance that a value of  $X^\sigma$  lies above  $\tau$ , on the other, must both be very small.

We emphasize that the variables  $X^\delta$  and  $X^\sigma$  depend on the device that produces the biometrics. Let  $f^\delta$  and  $f^\sigma$  denote their distribution functions. The decisive number  $\tau$  above is called an *error threshold*: and experimental estimates of  $f^\delta$  and  $f^\sigma$  must allow a ready choice of threshold. These estimates must allow the secure estimation of the probabilities  $p[X^\delta < \tau]$  and  $p[X^\sigma > \tau]$  as well. The first of these is what we had called the *specified identification error* for the device; and *specified verification error* seems a good name for the second. Biometrics produced by a device are said to *match* if the distance between them falls below a chosen threshold: and *falsely match* if they are numerized representations of distinct organic objects. We shall sometimes say that the objects themselves match or falsely match. We have said "identification error" for the chance of a false match: misusing words for the sake of brevity, and the specified identification error for a device, for a specified threshold, is its manufacturer's estimate of the probability of a false match. Verification error will not figure a very great deal in what follows; but we note that it is usually called the probability of a *false non-match*.

**2.1** For numerized representations that are real vectors the most common measure of difference would be Euclidean distance: or the *Mahalanobis distance* if the vectors may be taken for values of a multivariate normal distribution, whose covariance matrix can be reliably estimated. When the biometrics are binary vectors a common measure would be the Hamming distance, provided the vectors are not sparse: which would most likely be the case.

One might ask how licit it is to treat such distances as values of a random variable arising as they do from a particular device. But the design of the device is detailed enough, presumably, to produce others which are operationally identical to it, and



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so the device may be regarded as a one 'black box' among many which each produce like outputs for like inputs. The matter is considered again, in a different context, in section 4 below. Write  $p_r^\sigma$  for  $p[X^\sigma > \tau]$  and  $p_r^\delta$  for  $p[X^\delta < \tau]$  now; where  $f^\sigma$  and  $f^\delta$  are integrable functions  $p_r^\sigma$  is the integral of  $f^\sigma$  over  $[\tau, \infty)$  and  $p_r^\delta$  the integral of  $f^\delta$  over  $(-\infty, \tau]$ . We note that  $X^\sigma$  is like the *genuine* distribution of [1] while  $X^\delta$  like the *inter-template* distribution there: but not quite the same: see Section 5 below. The graphs  $f^\sigma$  and  $f^\delta$  will peak, ideally, around means or primary modes that are widely separated, given their respective variances: look at Slide 49 in [2]. One would like the mass of  $f^\sigma$  concentrated around a mode far to the left of where the mass of  $f^\delta$  accumulates: and the threshold  $\tau$  should lie many standard deviations to the right and to the left, at once, of the primary modes of  $f^\sigma$  and  $f^\delta$  respectively. The choice of a threshold  $\tau$ , and the determining of the associated identification and verification errors, is a complicated affair in practice: see [1]. Moving  $\tau$  to the left will decrease identification error while increasing verification error: and moving it right will increase the first and decrease the second. Plotting estimates of  $p_r^\delta$  against estimates of  $p_r^\sigma$ , for varying values of the threshold  $\tau$ , gives a curve called the *receiver operating characteristic* for the device. which, under ideal circumstances, would display how changes in either identification error or verification error inversely affects the other.

We must note that "identification error" and "verification error" are not standard ways of referring to the probabilities they denote. They are often referred to as 'error crossover rates' and the first, which we shall most be concerned with, is sometimes called the chance of a *false positive match* for the device in question: or the *false reject rate* for the device. But these latter terms find their proper use in the context of creating and maintaining biometric databases. as we shall shortly see

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We confine ourselves from here on to the biometric identification of human individuals. Suppose now that more than one physical or physiological feature will be used to do so. Let  $\{F_1, F_2, \dots, F_K\}$  be the features whose numerized representations are to provide a suite of identificatory biometrics for an individual; and suppose further that, for some considerable population of individuals, one such suite of identifying representations is to be stored, for each individual, in some biometric database. The process of gathering and storing identificatory biometrics is termed *enrollment* usually: and these stored representations are called *templates*. So in the situation we envisage there are *keepers of identity*: let us, melodramatically enough, style so the administrators of the biometric database: and they are charged with obtaining and storing, for each individual in the population, a suite  $\{b_1, b_2, \dots, b_K\}$  of templates, where each  $b_k$  is a numerized representation of the feature  $F_k$  now, for  $k \in \{1, 2, \dots, K\}$ . There will be a device  $M_k$  to scan  $F_k$ : whose manufacturer will have supplied the keepers of identity a crossover threshold  $\tau_k$  for the device, as well as the specified errors  $\rho_k$  and  $\nu_k$  of identification and verification, respectively, which are associated with that threshold. The threshold and associated errors will have been obtained by estimating the distributions of random variables  $X_k^\delta$  and  $X_k^\sigma$  which are the counterparts of  $X^\delta$  and  $X^\sigma$  above: and  $\rho_k$  is the manufacturer's estimate of the probability  $p[X_k^\delta < \tau_k]$  now, while  $\nu_k$  is the like estimate of the probability  $p[X_k^\sigma > \tau_k]$ .

In the typical situation of enrollment the keepers of identity are facing a putatively new enrollee — a person whose biometrics are not yet in their database. Let us call this individual  $S$ . Numerized representations  $\{v_1, v_2, \dots, v_K\}$  of the features  $\{F_1, F_2, \dots, F_K\}$  are obtained from  $S$  now and before they are entered in the database as his or her suite of biometric templates they must be compared with *every other* suite of templates already in the database, of course, because each suite is meant to identify one and only one individual. So suppose that some  $n$  many persons have already been enrolled; and let  $\{P_1, P_2, \dots, P_n\}$  be some listing of these. For each index  $i$  in  $\{1, 2, \dots, n\}$  let  $\{b_{1,i}, b_{2,i}, \dots, b_{K,i}\}$  be the templates of the person  $P_i$ . We shall suppose now that each suite of biometrics in the database does correspond to a distinct individual: we suppose that there are no duplications, that is, in the database. For each  $k$  in  $\{1, 2, \dots, K\}$  let  $x_{k,i}$  be the distance between  $v_k$  and  $b_{k,i}$  now, assuming that  $S$  is not already enrolled, the number  $x_{k,i}$  can be taken for a value of the random variable  $X_k^\delta$ ; and it does seem licit, assuming this, to regard the collection  $\{x_{k,1}, x_{k,2}, \dots, x_{k,i}, \dots, x_{k,n}\}$  as a random sample of values drawn from  $X_k^\delta$ .

As  $\rho_k$  estimates the chance that any given value of  $X_k^\delta$  will fall below  $\tau_k$  we may expect that  $\rho_k \cdot n$  values from the sample will fall below this threshold: assuming, of course, that  $S$  is not actually enrolled. For each  $k$  in  $\{1, 2, \dots, K\}$  let  $\Gamma_k[S]$  denote the subset of those enrolled persons for whom such falling below the corresponding threshold happens:  $P_i$  is in  $\Gamma_k[S]$  when  $x_{k,i} < \tau_k$  that is to say. So the chance of finding any given enrolled person in  $\Gamma_k[S]$  is  $\rho_k$  now, and when  $n$  is suitably large — large enough for each quantity  $\rho_k \cdot n$  to appreciably exceed 1, for instance — we must expect that none of the sets  $\Gamma_k[S]$  will be empty. That is no reason to suppose, of course, that any one person will be found in each of these sets — it may be that their intersection  $\Gamma[S] \equiv \bigcap_k \Gamma_k[S]$  is empty. But if we assume that each variable  $X_k^\delta$  is independent of every other  $X_k^\delta$  now, then for any enrolled person  $P_i$  we can estimate the probability that he or she will be found in each and every  $\Gamma_k[S]$ : that will happen only if  $x_{k,i} < \tau_k$  for every index  $k$  in  $\{1, 2, \dots, K\}$  of course, so the product  $\rho_1 \rho_2 \cdots \rho_K$  estimates that probability.

Suppose next that finding any  $P_i$  at all in  $\Gamma[S]$  provides grounds enough for the keepers of identity to doubt that  $S$  is not already enrolled: the circumstance that  $\Gamma[S]$  is not empty, then, when  $S$  is actually not enrolled, is usually termed a *false positive match*. Let us say that  $S$  and an enrolled  $P_i$  are *matched* at the feature  $F_k$  if  $x_{k,i} < \tau_k$ : the condition of finding of an enrolled  $P_i$  in  $\Gamma_k[S]$  specifies the *matching protocol* followed by the keepers of identity — and here a match occurs between an enrollee and any given enrolled person just in case they match at every numerized feature. Set  $\xi = \rho_1 \rho_2 \cdots \rho_K$  now: we shall call this the *specified identification error for the matching procedure*: which, to make it entirely explicit, is the estimated probability that a match will occur between an unenrolled individual and *any given* enrolled person.  $\xi$  is a prior estimate of that probability, of course, got from the errors specified by their manufacturers for the devices being used: the conditions of their use in the process of enrollment, in the field, may be expected to differ from the laboratory conditions of their testing. We shall return to the question.

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On our terms here the chance of a false positive match is the probability that  $\Gamma[S]$  does not turn out empty even though  $S$  is not enrolled: and we can make a prior estimate of this latter chance in terms of the identification error  $\xi$  for the matching protocol. As  $\xi$  estimates the probability that any given enrolled person is found in the set  $\Gamma[S]$ , we may take  $1 - \xi$  for the complementary probability that a given enrolled person is *not found* in  $\Gamma[S]$ . It seems licit to assume the following: whether or not any one enrolled person will be found in  $\Gamma[S]$  is independent of whether or not any other enrolled person will be found there: so when  $n$  many distinct persons have already been enrolled we have  $(1 - \xi)^n$  estimating the chance that  $\Gamma[S]$  is empty: and so the probability that  $\Gamma[S]$  is not empty, which is the chance of a false positive match here, is the quantity  $1 - (1 - \xi)^n$ .

Since  $0 < \xi < 1$  we have  $0 < 1 - \xi < 1$  as well, so  $(1 - \xi)^n$  decreases as  $n$  increases: and so the false reject rate will rise as enrollment proceeds. The increase in the false reject rate keeps pace with enrollment: we have

$$(i) \quad 1 - (1 - \xi)^n = n \cdot \int_0^\xi (1 - t)^{n-1} dt \leq n \cdot \int_0^\xi dt = n \xi$$

actually, as  $0 < (1 - t) \leq 1$  for  $0 \leq t \leq \xi < 1$ . Since it depends thus on the number enrolled we shall write  $\phi(n) \equiv 1 - (1 - \xi)^n$  for what the false reject rate comes to when  $n$  many have been enrolled. To save writing in what follows we shall simply say *a match occurs* when the biometrics of an enrollee match some stored template. So  $\phi(n)$  is the probability that a false positive match will occur for the next individual  $S$  who is to be enrolled: the chance that, even though he or she is not enrolled, the biometrics of  $S$  will match the templates of *some or other* enrolled person  $P$ .

That the chance of a false positive match remain low is an evident desideratum. That enrolled persons trying to enroll again should be detected would be equally important. and we must consider next the chance that an enrolled individual will succeed in enrolling again. The probability of such an event is called the *false accept rate* usually. Let us write  $\alpha$  simply for the false accept rate: for the keepers of identity may expect this rate to depend on the specified verifications errors  $\nu_k$  only. or on what the corresponding errors will be in the field, more properly: but let us suppose for the moment that their devices perform as they are expected to.

Let  $D$  denote the biometric database, for brevity, and suppose next that  $S$  is an already enrolled person seeking to enroll again: using an alias presumably. The templates taken at his or her prior enrollment will have created an *avatar*  $P[S]$  for  $S$  in  $D$  let us say: a different virtual or spectral person, from the perspective of the keepers of identity: and  $\nu_k$  is their estimate, provided by the manufacturer of  $M_k$ , of the chance that  $S$  and this spectral  $P[S]$  are *not matched* at the feature  $F_k$ . The probability that enrolled persons and their avatars do match at  $F_k$  should be estimated as  $1 - \nu_k$  then. Write  $\nu$  now for the probability that *no match occurs* between an enrolled person  $P$  and his or her own avatar  $P[S]$ . Given the matching protocol they are following, and

assuming again that matching at one feature is independent of matching at any other feature, the keepers of identity should estimate

$$(ii) \quad 1 - \nu = \prod_{k=1}^K [1 - \nu_k]$$

as the chance that a match *will* occur between an already enrolled person and his or her own avatar in  $D$  because a match is taken to occur only when matches occur at every feature. Note that whether or not matchings at distinct features are independent, this complementary probability — which is the probability that *an attempt to enroll again will be detected* — actually decreases when more than one device is used: but if  $K$  is a small count and if each  $\nu_k$  is a miniscule quantity the decrease should be negligible. In the mean we have

$$(iii) \quad \nu = 1 - \prod_k [1 - \nu_k]$$

$$(iv) \quad 1 - \alpha \geq 1 - \nu$$

The inequality (iii) only restates (ii) of course. The inequality (iv) obtains because the probability of a match occurring between an already enrolled applicant  $S$  and *some or other* enrolled  $P$  is at least as great as the chance of a match occurring between  $S$  and his or her own avatar  $P[S]$ ; and from (iii) and (iv) we finally get the upper bound

$$(v) \quad \alpha \leq \nu = 1 - \prod_k [1 - \nu_k]$$

We record once again that our bounds on the false reject and false accept rates derive from assuming that matching at any one feature  $F_k$  is independent of matching at any other feature  $F_j$ , a circumstance we shall call *the independence of the metrized features*. Assuming that such independence obtains amounts to assuming that  $\{X_k^\delta\}_{k=1}^K$  is a collection of independent random variables; and  $\{X_k^\sigma\}_{k=1}^K$  likewise, and we note that the assumption is generally made

Consider next the converse of a false positive match: the circumstance that an individual is not enrolled, in fact, though a match does occur for him or her. We shall cast matters in the usual language of probability now. Suppose that a number of persons have already been enrolled, and let  $S$  be the next individual presented to the keepers of identity. Let  $A$  now denote the circumstance that  $S$  is already enrolled, and  $A^c$  the complementary circumstance that he or she is not. Let  $B$  denote the circumstance that a match occurs for  $S$ , and  $B^c$  the complementary circumstance of no match occurring. The false reject rate is the conditional probability  $p[B|A^c]$  then: the chance that a match occurs given that  $S$  is not actually enrolled. The false accept rate is the conditional probability  $p[B^c|A]$ : the probability that no match occurs given that  $S$  is already enrolled.

Now  $p[A^c|B]$  is the probability that  $S$  is not enrolled, actually, given that a match occurs: the chance of what was termed *mistaken identification* in the introductory summary of findings. Write  $p(E)$  for the probability of any event

or circumstance  $E$ , write  $p(E \& F)$  for the probability of the conjunction of events or circumstances  $E$  and  $F$ ; the formula

$$(vi) \quad p[A^c|B] \cdot p(B) = p(A^c \& B) = p[B|A^c] \cdot p(A^c)$$

relates the probability of mistaken identification to the false reject rate: so we could estimate the former from the latter if we could estimate  $p(A^c)$  and  $p(B)$ . Let us suppose now that  $S$  is a randomly selected individual. The probabilities  $p(A)$  and  $p(A^c) = 1 - p(A)$  may be taken generally, now, to depend on the compulsions of individuals in the population that is being enrolled. Estimating them would, nonetheless, be very risky. But suppose the population is very large: as it is in our case, where UIDAI is engaged upon biometrically identifying every resident of India. Suppose as well that, when a substantial number have been enrolled, the keepers of identity may reasonably take themselves to have sampled the population randomly: they may estimate  $p(A)$  then: provided that they have been very successful in detecting attempts to enroll more than once. The personnel of the UIDAI have been bold enough to do so in fact: as we shall momentarily see. Now  $p(B)$  is the probability of a match occurring regardless of whether or not  $S$  is already enrolled and the formula

$$(vii) \quad \begin{aligned} p(B) &= p[B|A^c] p(A^c) + p[B|A] p(A) \\ &= p[B|A^c] p(A^c) + (1 - p[B^c|A]) p(A) \end{aligned}$$

computes the chance of a match occurring for  $S$  from the false reject rate and the false accept rate, and from the general probability that an enrolled individual will try to enroll again. The specified verification errors yield the upper bound on the false accept rate given in (iv) above: from which the keepers of identity may expect that these probabilities will not change appreciably as enrollment proceeds. So when a substantial number have been enrolled they could try to estimate, with a suitable experiment, what the false accept rate is for their matching protocol: and the personnel of the UIDAI have done so in fact.

In the following section, where we consider the operations of the UIDAI in detail, we shall be using their experimentally obtained estimates of  $p(A)$  and  $p[B^c|A]$  to estimate the chance of mistaken identification. To do so accurately we require an estimate of what the false reject rate will be in the field: which depends the identification error, in the field, for the matching protocol they are following. As we mentioned our introductory summary, after enrolling a substantial number the UIDAI had conducted an experiment to estimate the false reject rate. We use that to estimate identification error in the field; and we end this preparatory section by deriving the bounds given by the formulae (1) and (2) and (3) in the summary of findings.

2.2 The inequality in (1) above provides the lower bound in (1) and the upper bound in (2) already. To obtain the upper bound in (1) note first that  $1 - \phi(n) = (1 - \xi)^n$  by definition, which gives  $\log[1 - \phi(n)] = n \log(1 - \xi)$ ; so we must relate  $\xi$  and  $\log(1 - \xi)$  to proceed. For  $0 < x < 1$  generally we have

$$\begin{aligned}\log(1-x) &= -\int(1-x)^{-1}dx = -\int(1+x+x^2+\dots)dx \\ &= -(x+x^2/2+x^3/3+\dots)\end{aligned}$$

since the series  $\sum_{r=0}^{\infty} x^r$  converges now. It is immediate that  $\log(1-x) < -x$  then and hence  $x < -\log(1-x)$ . So we have

$$\zeta \leq -\log(1-\xi) = -\log[1-\phi(n)]/n$$

yielding the upper bound for (1). We get a lower bound on  $\log(1-x)$  from its expression as the series above: simply note that

$$(x+x^2/2+x^3/3+\dots) < (x+x^2+x^3+\dots) = x(1+x+x^2+\dots) = x/(1-x)$$

which gives us  $-x/(1-x) < \log(1-x)$ , and the bounds  $x < -\log(1-x) < x/(1-x)$  will help obtain the lower bound in (2). From these bounds on  $-\log(1-x)$  we get the inequalities  $nx < -n\log(1-x)$  and  $-n\log(1-x) < nx/(1-x)$  first; and

$$1 - n\log(1-x) < (1-x+nx)/(1-x)$$

follows from the second, for  $0 < x < 1$  and positive integers  $n$ , now the first and the third inequalities together yield

$$(1.1) \quad nx/(1-x)/(1-x+nx) < [-n\log(1-x)]/[1-n\log(1-x)]$$

Let  $y > 0$  next; we must take a detour here and note that from  $1+y < e^y$  we get

$$\begin{aligned}e^{-y} + ye^{-y} &< e^ye^{-y} = 1 \\ 0 &< 1 - e^{-y} - ye^{-y} \\ y &< 1 + y - e^{-y} - y \cdot e^{-y} = (1+y)(1-e^{-y})\end{aligned}$$

That yields the very useful inequality

$$(1.2) \quad y/(1+y) < 1 - e^{-y}$$

For  $0 < x < 1$  set  $t = -\log(1-x)$  now, we have  $x = 1 - e^{-t}$  and  $e^{-t} = 1 - x$  then, whence  $e^{-nt} = (1-x)^n$  and  $nt = -n\log(1-x)$ ; then for positive integers  $n$  we obtain

$$\begin{aligned}nx/(1-x)/(1-x+nx) &< [-n\log(1-x)]/[1-n\log(1-x)] = nt/(1+nt) \\ &< 1 - e^{-nt} = 1 - (1-x)^n\end{aligned}$$

from (1.1) and (1.2) above, which is what we need for the lower bound in (2). For the upper bound we have in (3) we must consider the *Incomplete Beta Function*. Set

$$B_x(a,b) \doteq \int_0^x t^{a-1}(1-t)^{b-1}dt$$

for arguments  $a, b$  and any  $0 < x \leq 1$  first, then  $I_x(a,b) \equiv B_x(a,b)/B_1(a,b)$  defines the Incomplete Beta Function for these arguments. It is usual to write  $B_1(a,b)$  as  $B(a,b)$  simply. Elementary integration, by parts, will give us

$$(1.3) \quad \int_0^x t^k(1-t)^{n-k-1}dt = \frac{-t^k(1-t)^{n-k}}{n-k} \Big|_0^x + \left[\frac{k}{n-k}\right] \int_0^x t^{k-1}(1-t)^{n-k}dt$$

Setting  $x = 1$  here yields the relation

$$(1.4) \quad B(k+1, n-k) = [k/(n-k)] B(k, n-k+1).$$

Now  $B(1, n) = \int_0^1 (1-t)^{n-1} dt = \left. \frac{-(1-t)^n}{n} \right|_0^1 = 1/n$ ; and iterating (1.4) gives

$$(1.5) \quad B(k+1, n-k) = \frac{k(k-1)}{(n-k)(n-k-1)} \cdot \frac{2 \cdot 1 \cdot 1}{(n-2)(n-1)n} = 1/[(n-k) \cdot C_{n,k}]$$

then We write  $B(a, b)$  as  $B_a^b$  below to save space; using  $B(a, b) I_x(a, b) = B_x(a, b)$  in equation (1.3) and evaluating the first term on the right there, we get

$$\begin{aligned} B_{k+1}^{n-k} I_x(k+1, n-k) &= \frac{-x^k(1-x)^{n-k}}{n-k} + \left[ \frac{k}{n-k} \right] \cdot B_k^{n-k+1} I_x(k, n-k+1) \\ &= B_{k+1}^{n-k} \cdot [-C_{n,k} \cdot x^k \cdot (1-x)^{n-k} + I_x(k, n-k+1)] \end{aligned}$$

since  $1/(n-k) = C_{n,k} B_{k+1}^{n-k}$  and  $[k/(n-k)] \cdot B_k^{n-k+1} = B_{k+1}^{n-k}$  from (1.5) and (1.4) respectively, and so we have

$$(1.6) \quad I_x(k+1, n-k) = I_x(k, n-k+1) - [C_{n,k} x^k (1-x)^{n-k}]$$

It is immediate from the computation of  $B(1, n)$  that  $I_x(1, n) = 1 - [1-x]^n$ , and then equation (1.6) yields, by induction, the well-known result

$$I_x(q, n-q+1) = 1 - \sum_{j=0}^{q-1} C_{n,j} \cdot \xi^j \cdot (1-\xi)^{n-j}$$

Now to obtain the upper bound in (3) we need only note that

$$B_q^{n-q+1} \cdot I_x(q, n-q+1) = \int_0^x t^{q-1} (1-t)^{n-q} dt \leq x^{q-1} \int_0^x (1-t)^{n-q} dt,$$

then, since  $(1-t) \leq 1$  when  $0 \leq t \leq \xi < 1$ , as we have here, we finally get

$$\begin{aligned} B_q^{n-q+1} \cdot I_x(q, n-q+1) &\leq \xi^{q-1} \int_0^\xi dt \leq \xi^q \\ I_x(q, n-q+1) &\leq \xi^q / B_q^{n-q+1} = \xi^q \cdot (n-q+1) \cdot C_{n,q-1} = [\xi^q / (q-1)!] \cdot \prod_{r=0}^{q-1} (n-r) \end{aligned}$$

as we need. We do not need lower bounds on  $I_x(q, n-q+1)$  when  $q > 1$ : but we give them for completeness. Note that  $(1-\xi)^k \geq 1-k \cdot \xi$  by (2) first, as  $1-t \geq 1-\xi$  for  $t < \xi$  we then have

$$\begin{aligned} B_q^{n-q+1} \cdot I_x(q, n-q+1) &\geq (1-\xi)^{n-q} \int_0^\xi t^{q-1} dt = (1-\xi)^{n-q} \cdot \xi^q / q \\ I_x(q, n-q+1) &\geq [(1-\xi)^{n-q} \cdot \xi^q] / [q \cdot B_q^{n-q+1}] \\ &= [((1-\xi)^{n-q}) \cdot \xi^q] / [q \cdot (q-1)!] \cdot \prod_{r=0}^{q-1} (n-r) \\ &\geq [1-n \cdot \xi + q \cdot \xi] \cdot [\xi^q / q!] \cdot \prod_{r=0}^{q-1} (n-r) \end{aligned}$$

The upper bound in (3) agrees with the upper bound in (2) when  $q = 1$ : the latter bounds are a special case of the former. But the lower bound in (2) will exceed the lower bound in (3) unless

$$\begin{aligned} 1 - n \cdot \xi + \xi &\geq (1-\xi)/(1-\xi+n \cdot \xi) \\ [1 - (n \cdot \xi - \xi)] [1 + (n \cdot \xi - \xi)] &= 1 - (n-1)^2 \xi^2 \geq 1 - \xi \\ (n-1)^2 \xi^2 &\leq \xi \end{aligned}$$

or  $(n-1)^2 \xi \leq 1$ ; and since this will hold less often than not for the range of  $n$  and the particular  $\xi$  we have in what follows, we shall use the lower bound in (2) always.

### 3 Calculations

In a note appearing in the journal *Pragati*, pertaining to the workings of the UIDAI and authored by a senior research associate at the Takshashila Institute, it is asserted that “the error crossover rate for fingerprinting and iris scans are 1 in 500 and 1 in 131000, respectively.”<sup>3</sup> These are error rates supplied by their manufacturers, presumably, for the biometric devices used by the UIDAI. The author does not say if these are rates for errors in identification, particularly, or for errors in verification. But a standard way of proceeding is to choose the error threshold for a device in such a way that identification error and verification error are identical: so we shall suppose that the specified identification errors are such.

3.1 The UIDAI itself has recently circulated a paper, titled **The Role of Biometric Technology in Aadhar Enrollment**, which reports an experimental estimate for the chance of a false positive match. The estimate was made when 84 million individuals had been enrolled. The experiment consisted of 4 million trials of the following description: in each trial a template is picked from the database, and compared against the remainder to see if a match occurs.<sup>4</sup> Assuming that the database contains no duplicates of the sampled templates, the number of times a match occurs should allow us to reliably estimate the chance of a false positive match, which, remember, is the probability that a match occurs given that the person is not enrolled. The paper reports that a match occurred 2309 times out of 4 million. There is no mention there of error crossover rates for the devices being used; and the UIDAI proceeds on the basis of its experiment to take  $2309/4 \cdot 10^6$  for what the probability of a false positive match was when 4 million had been enrolled. The matching protocol they are following is not specified either, so one must look about a little to see if the experimental estimate accords with the specified identification errors for their devices. But taking  $r = 2309/4 \cdot 10^6 = 0.00057725$  as a reliable estimate of  $\phi(n)$  for  $n = 84 \cdot 10^6$  we may estimate the identification error in the field: writing  $\xi$  for identification error in the field now, and using the formula (1) from the summary of findings, we have

$$r/n \leq \xi \leq [-\log(1-r)]/n = \sum_{k=1}^{\infty} r^k/(k \cdot n)$$

for bounds on  $\xi$  now, and since  $r^4/4 \cdot n < 10^{-21}$  already for the values of  $r$  and  $n$  here, and as we have  $(1.2) \cdot 10^9$  for an upper limit on the number to be enrolled, it should suffice to set

$$(\dagger) \quad \xi = r/n + r^2/(2 \cdot n) + r^3/(3 \cdot n) = (0.687400801) \cdot 10^{-11}$$

with  $r = 2309/4 \cdot 10^6$  and  $n = 84 \cdot 10^6$ . We must now contrive to discern

<sup>3</sup> The note is titled “Securing the Identity”, it appeared in the ‘roundup’ section of the journal, on 06.01.2012, the author is R. Srikanth.

<sup>4</sup> The item numbered 2 in Section 4.1 of the paper describes the experiment.



the matching protocol: to do which we must consider various possibilities and compute, from the identification errors specified for the devices, the specified identification errors for these matching schemes.

But we need consider a very few variants only, as it happens: for one can make a good guess, from the paper itself, at what the UIDAI's matching protocol must be. The physical features being metrized here are two irises and the insides of fingers and thumbs. The UIDAI's stated reason for using irises is that "people working in jobs that require repeated use of fingers — for example, in fireworks factories or in areca nut plantations — often find their fingerprints degraded, which makes iris useful in ensuring uniqueness": and further remarks made apropos of the need for using irises suggest how the decision might be made. The 'proof of concept' exercise that the UIDAI had conducted, before enrollment was begun *en masse*, is said to have "clearly demonstrated that iris capture was indeed necessary, and along with fingerprint, it was sufficient to de-duplicate and uniquely identify the entire population": and "the accuracy of the combined system is an order of magnitude better," the paper goes on to say, "than fingerprints alone or iris alone." One 'order of magnitude' is a factor of 10 here. and the second remark tempts one to guess that deciding on matches is done as follows: a match is taken to occur between an individual  $S$  presented for enrollment and an enrolled  $P$  if  $S$  and  $P$  are matched at *both* irises and at *any one* digit. The immediate motive for this guess is that the chance of a false match occurring at some or other digit, between an unenrolled  $S$  and an enrolled  $P$ , is roughly  $1/50$  now: given a specified identification error of  $1/500$  for fingerprint scanners: and assuming, again, the independence of the metrized features. But to make good our guess we should compute specified identification errors for close variants of this matching scheme. A few preliminaries are in order. Set

$\rho_i \equiv$  specified identification error for the iris scanner

$\rho_\delta \equiv$  specified identification error for the fingerprint scanner

$\rho_{\delta,k} \equiv \sum_{s=k}^{10} C_{10,s} \cdot \rho_\delta^s \cdot (1 - \rho_\delta)^{10-s}$

For  $1 \leq k \leq 10$  the quantity  $\rho_{\delta,k}$  is the probability that, when  $S$  is not enrolled, comparing the numerized representations of his or her fingers to the representations of  $P$ 's fingers, digit to corresponding digit, will result in at least  $k$  matches:  $\rho_{\delta,k}$  is the probability, in short, that an unenrolled  $S$  and an enrolled  $P$  are matched at  $k$  digits at least.

Let  $\xi_0$  denote the specified identification error for any matching protocol: we have  $\xi_0 = \rho_i^2 \cdot \rho_{\delta,1}$  now for the matching scheme that is our guess: assuming, to note it once more, the independence of the metrized features. We summarize below that scheme and its closest variants, and their specified identification errors, with the  $\rho_\delta = 1/500$  and  $\rho_i = 1/131000$ ; the first two columns list required matches.

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irises	digits	$\xi_0$
2		$\rho_i^2 = 0.582779560 \cdot 10^{-10}$
2	$\geq 1$	$\rho_i^2 \cdot \rho_{\delta,1} = 0.115512486 \cdot 10^{-11}$
2	$\geq 2$	$\rho_i^2 \cdot \rho_{\delta,2} = 0.103776040 \cdot 10^{-13}$

Our conjectured matching protocol is the second one here, and given the estimate in (†) for identification error in the field, the guess seems a good one, for the difference between specified error and field error is the least for that choice. Note also that, in going from the first to the second of the variants listed above, specified identification error does decrease by somewhat more than “one order of magnitude”. We shall take our conjectured one to be the matching protocol followed by the UIDAI then; and for this scheme the ratio of field error to specified error is  $0.687400801/0.115512486 = 5.950878773 \approx 6$

3.1.1 We are assuming that, whatever the matching protocol of the UIDAI might be, both irises will be scanned: and we had just noted the ‘one order of magnitude’ decrease in the specified identification error when going from using only *irises* to our conjectured matching protocol. But we shall summarize, for completeness, a few other possible matching schemes. As a preliminary set

$$\rho_{i,1} \equiv 1 - (1 - \rho_i)^2$$

$\rho_{i,1}$  is the probability that an unenrolled *S* and an enrolled *P* will match at *one or other* iris. With  $\rho_{\delta,k}$  as it was defined above, and with the values of  $\rho_i$  and  $\rho_{\delta}$  just given, the following table lists matching schemes and specified identification errors. The first two columns list required matches, as before, for the first four of the listed schemes only one iris is scanned; for the last three both irises are scanned, but a match occurring at either will do

irises	digits	$\xi_0$
1	$\geq 1$	$\rho_i \cdot \rho_{\delta,1} = 0.151313186 \cdot 10^{-6}$
1	$\geq 2$	$\rho_i \cdot \rho_{\delta,2} = 0.135953906 \cdot 10^{-8}$
1	$\geq 3$	$\rho_i \cdot \rho_{\delta,3} = 0.725230000 \cdot 10^{-11}$
1	$\geq 4$	$\rho_i \cdot \rho_{\delta,4} = 0.256474002 \cdot 10^{-13}$
$\geq 1$	$\geq 2$	$\rho_{i,1} \cdot \rho_{\delta,2} = 0.271890000 \cdot 10^{-8}$
$\geq 1$	$\geq 3$	$\rho_{i,1} \cdot \rho_{\delta,3} = 0.145036500 \cdot 10^{-10}$
$\geq 1$	$\geq 4$	$\rho_{i,1} \cdot \rho_{\delta,4} = 0.512914410 \cdot 10^{-13}$

Consider the third matching scheme summarized here. Only one iris is scanned now, and all ten digits: and a match will be taken to occur if a match occurs at the *iris* and at *any three* corresponding digits. The specified identification error here is nearly an order of magnitude less than the scheme which uses only the two irises: so this scheme is also a candidate for the matching protocol the UIDAI is actually using, and in that case the specified identification error would be very close to the estimate in (†) for identification error in the field

But if the use of fingerprints is risky because “people working in jobs that require repeated use of fingers ... often find their fingerprints degraded,”

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then it would be prudent to use as few digits as possible for the matching protocol. and the specified identification error for our conjectured scheme is considerably less besides, by more than a factor of 6 now, than the error for candidate we have just looked at and that should have decided UIDAI to choose the former scheme over the latter, surely, were both being considered. Moreover, if using three digits poses little risk, then using two digits poses even less; and in that case the best strategy would have been to use the stricter variant of our conjectured scheme, which was summarized in the third line of the previous table, where a match would be taken to occur if matches occurred at both irises and at *any two* digits. The specified identification error of  $0.103776040 \cdot 10^{-13}$  would have been three orders of magnitude less, now, than the error of  $0.582779560 \cdot 10^{-10}$  for the scheme using matches only at both irises; so the UIDAI should surely have gone with that, rather, if they were willing to go with the candidate we first looked at here. So we shall stay with our conjectured scheme.

3.2 As we are now considering the operations of the UIDAI in particular, we shall refer to individuals presented for enrollment as *applicants* for a UID or a 'unique identity' precisely. Following the report of the experiment to estimate the false match rate  $p(B|A^c)$  for the next unenrolled applicant after 84 million had been enrolled, the paper put out by the UIDAI describes an experiment designed to estimate the false accept rate: which is the conditional probability  $p(B^c|A)$  that a match will not occur given that, on the contrary, the applicant is already enrolled. We have already noted that the false accept rate does not depend on the number of individuals already enrolled. and in (v) of the previous section we had derived an upper bound for this probability from the specified verification errors of the devices being used.

The second experiment consisted in 31,399 trials of the following description. In each trial an enrolled person is selected at random from the database, and a fresh suite of biometrics is obtained from him: and that suite is compared against each suite of templates in the database, then, to see if a match occurs. One should expect matches now of course: particularly because the fresh suite is being compared against the template of the enrolled individual himself, among others. In 31,388 of these trials a match did indeed occur: so  $11/31399$  is the UIDAI's experimental estimate of the false accept rate  $p(B^c|A)$ .<sup>5</sup> From the general relation

$$p(B|A) + p(B^c|A) = [p(B \& A) + p(B^c \& A)]/p(A) = p(A)/p(A) = 1.$$

we get  $p(B|A) = 1 - p(B^c|A)$ : and  $31388/31399$  is the estimate we have of this probability now: which we shall regard as fixed because, as we have noted, the complementary false accept rate does not change as enrollment proceeds.

<sup>5</sup> The results of the latter experiment are reported in the item numbered 3 in Section 4.1 of *The Role of Biometric Technology in Aadhar Enrollment*. The phrase "false negative identification rate" is used there for the false accept rate, which is, of course, the chance that an already enrolled person will succeed in getting enrolled again: presumably under an alias. The paper approximates  $p(B^c|A)$  as 0.000352, while  $0.0003503 < 11/31399 < 0.0003504$ , a Bayesian estimate must have been made, one supposes, with some likely prior.

3.2.1 One might ask after the propriety of estimating both  $p(B|A^c)$  and  $p(B^c|A)$  with just such experiments: by computing suites of distances  $\{x_1, x_2, \dots, x_K\}$  between the templates of enrolled persons, or between the latter and freshly taken biometrics of such persons. But complications would arise only if appeal were made to the distributional properties an  $x_k$  would have when it is regarded as a value of  $X_k^i$ : and that cannot be done, obviously, when  $p(B^c|A)$  is being estimated. No such appeal is being made, however, in the calculations. We have suites of distances obtained in two distinct ways: by template-to-template comparisons first, where the elements of a compared pair derive from distinct persons, and then by comparisons of fresh biometrics to templates. In the latter case the elements of a compared pair will not always derive from distinct persons. We may identify the conditional circumstances  $(B|A^c)$  and  $(B^c|A)$  with concatenations of certain numerical events, now, which are determined by how each  $x_k$  lies to the threshold  $\tau_k$  only, without regarding the number as a value of either  $X_k^i$  or  $X_k^c$  or as a value of any distribution, for that matter, and our *interpretations* of these numerical circumstances as recognizable eventualities are secured by how these suites of distances are got.

Our ultimate interest here is in the probability  $p(A^c|B)$  of mistaken identification: the computing of which requires the converse  $p(B|A^c)$  and the simple probabilities  $p(B)$  and  $p(A^c)$  as well, as we noted in (vi) above: and from (vii) we see that an estimate of either  $p(A^c)$  or its complement  $p(A) = 1 - p(A^c)$  together with estimates of  $p(B|A^c)$  and  $p(B|A)$  will allow us to estimate  $p(B)$ .

Now following the report of the second experiment one finds that the UIDAI has determined to its satisfaction a "current 0.5% rate of duplicate submissions" which seems to say that 0.5% of the applicants turn out to have been enrolled already, by the time 84 million had been enrolled. Assuming that the entire population to be enrolled had been randomly sampled by then, we may take  $p(A) = 0.005$  and  $p(A^c) = 0.995$  for stable estimates of these probabilities: and the UIDAI is prepared to assume, we note, that the 'rate of duplicate submission' will neither decrease nor increase as enrollment proceeds.<sup>6</sup>

3.3 We can now proceed with the calculations for our other two findings. Our first object is to compute the probability of mistaken identification for various subsets of the population: which is estimated by the ratio of false matches to all matches. We shall begin by estimating the number of matches that will have occurred by the time enrollment is complete, and estimate the number of false matches among these. The population of India is said to be 1.2 billion; so for each  $n$  between 1 and  $(1.2) \cdot 10^9$  we must consider what the false reject rate  $\phi(n)$  becomes by the time  $n$  individuals have been enrolled, and the lower bound in (2) gives the safe approximation

$$(2.1) \quad \phi(n) \approx [n \xi (1 - \xi)] / [1 - \xi + n \cdot \xi]$$

<sup>6</sup> I refer the reader again to the item numbered 3 in Section 4.1 of *The Role of Biometric Technology in Aadhar Enrollment*.

of  $p(B|A^c)$  for the next individual to be enrolled. Using  $\xi$  from (†) now, the easiest way to go would be to obtain a linear estimate for last term: otherwise we shall have to make 1.2 billion estimates. We shall come back to the question

Write  $\beta(n)$  for the probability that a match will occur for the next individual to be enrolled: we get  $\beta(n) = \phi(n) \cdot p(A^c) + p(B|A) \cdot p(A)$  then from the formula (vii) that we had for  $p(B)$  above. The estimates of the UIDAI give us

$$p(B|A) \cdot p(A) \approx [31388/31399] \cdot (0.005) = 0.004998248 \\ p(A^c) \approx 0.995$$

Set  $\gamma \equiv 0.004998248$  for convenience. Suppose a total of  $Q$  many individuals are to be enrolled; let  $m(Q)$  denote the total number of matches we expect. Assuming that the occurrences of matches are independent, as we may, we get

$$(2.2) \quad m(Q) = \sum_{n=1}^{Q-1} \beta(n) \approx \sum_{n=1}^{Q-1} [p(A^c) \cdot \phi(n) + p(B|A) \cdot p(A)] \\ \approx p(A^c) \cdot [\sum_{n=1}^{Q-1} \phi(n)] + \gamma \cdot (Q-1)$$

For quick count of  $m(Q)$  note first that  $\phi(n) \geq [n \cdot \xi \cdot (1-\xi)]/[1-\xi+Q \cdot \xi]$  always. Setting  $\lambda = 0.687400801$  for convenience as well, we have  $\xi = \lambda \cdot 10^{-11}$  from (†) now; and with and  $Q = (1.2) \cdot 10^9$  we will, with a little calculation, obtain the approximations

$$(2.3) \quad [\xi \cdot (1-\xi)]/[1-\xi+Q \cdot \xi] \approx \frac{\lambda}{10^9 (10^2 + (1.2) \lambda)} = \frac{0.681777}{10^{11}}$$

$$(2.4) \quad p(A^c) \cdot [\xi \cdot (1-\xi)]/[1-\xi+Q \cdot \xi] \approx \frac{(0.995)(0.681777)}{10^{11}} = \frac{0.678368115}{10^{11}}$$

Set  $\eta \equiv (0.678368115)/10^{11}$  now. from the relations (2.1) and (2.4) and (2.2) just above we have

$$m(Q) \geq \eta [\sum_{n=1}^{Q-1} n] + \gamma \cdot (Q-1) = [\eta \cdot Q \cdot (Q-1)]/2 + \gamma \cdot (Q-1)$$

then. Note next that  $(Q-1) = (1.2) \cdot (10^9 - 1) + (0.2)$  when  $Q = (1.2) \cdot 10^9$  since  $(a \cdot 10^9 - 1) - a \cdot (10^9 - 1) = a - 1$ . So the approximations

$$Q-1 \approx (1.2) \cdot (10^9 - 1)$$

$$Q \cdot (Q-1) \approx (1.2) \cdot 10^9 \cdot (1.2) \cdot (10^9 - 1) = (1.44) \cdot 10^9 \cdot (10^9 - 1)$$

may safely be used for estimation, given the values declared for  $\eta$  and  $\gamma$  here; and from the inset calculation below we see that  $m(Q)$  will equal or exceed 10,882,148 now

$$m(Q) \geq [\eta \cdot Q \cdot (Q-1)]/2 + \gamma \cdot (Q-1) \\ \approx \frac{(0.678368115)(1.44) \cdot 10^9 \cdot (10^9 - 1)}{10^{11} \cdot 2} + \frac{(1.2) \cdot (10^9 - 1) \cdot (0.004998248)}{10^2} \\ = \frac{(0.488425043) \cdot 10^9 \cdot (10^9 - 1)}{10^4} + \frac{(0.5997898) \cdot (10^9 - 1)}{10^2} \\ \approx (4884250 + \frac{43}{100}) \cdot (1 - \frac{1}{10^9}) + 5997898 - \frac{0.5997898}{10^2}$$

$$\approx 4884250 + 5997898 + (0.43 - 0.005 - 0.006) \approx 10882148$$

For the approximation in (2.3) we do as follows with  $\lambda$  and  $Q$  as they are above

$$\begin{aligned}\xi &= \frac{\lambda}{10^{11}} = \frac{\lambda \cdot 10^{-6}}{10^5} \\ 1 - \xi &= \frac{10^5 - \lambda \cdot 10^{-6}}{10^5} \\ Q \cdot \xi &= \frac{(1.2) \cdot \lambda}{10^5} = \frac{(1.2) \cdot \lambda \cdot 10^3}{10^8} \\ 1 - \xi + Q \cdot \xi &= \frac{10^5 - \lambda \cdot 10^{-6} + (1.2) \cdot \lambda \cdot 10^3}{10^5} \\ [1 - \xi]/[1 - \xi + Q \cdot \xi] &= \frac{10^5 - \lambda \cdot 10^{-6}}{10^5 - \lambda \cdot 10^{-6} + (1.2) \cdot \lambda \cdot 10^3} \approx \frac{10^5}{10^5 + (1.2) \cdot \lambda \cdot 10^3} = \frac{10^2}{10^2 + (1.2) \cdot \lambda} \\ [\xi \cdot (1 - \xi)]/[1 - \xi + Q \cdot \xi] &\approx \frac{\lambda \cdot 10^2}{10^{11} (10^2 + (1.2) \cdot \lambda)} = \frac{\lambda}{10^9 (10^2 + (1.2) \cdot \lambda)}\end{aligned}$$

We underestimate  $m(Q)$  here by using a uniform lower bound for  $\phi(n)$ : and we shall provide a more accurate estimate momentarily. But one should expect more than 10.88 million matches to have occurred, at any rate, by the time enrollment is complete.<sup>7</sup> Let us now count the false ones among all the matches. The probability  $p(B \& A^c)$  is what we must attend to: so let  $\varepsilon(n)$  denote the chance that, once  $n$  individuals have been enrolled, the next applicant is not enrolled and that, nonetheless, a match does occur. As  $p(B \& A^c)$  equals  $p(B|A^c) \cdot p(A^c)$  we get

$$\varepsilon(n) = \phi(n) \cdot p(A^c) \approx \eta \cdot n = \left[ \frac{0.678368115}{10^{11}} \right] \cdot n$$

from (2.1) and (2.4) and (2.2) again. Let  $d(Q)$  denote the total number of unenrolled applicants for whom a match will have occurred by the time enrollment is complete: the total number of false matches, that is to say. Assuming that such matches are independent of each other as well, we get  $\sum_{n=1}^{Q-1} \varepsilon(n)$  as our estimate of this number: whence

$$d(Q) = \sum_{n=1}^{Q-1} \varepsilon(n) \approx \eta \left[ \sum_{n=1}^{Q-1} n \right] = \eta \cdot Q \cdot (Q-1)/2$$

now, and from the computation we had just now performed for  $m(Q)$  we see that  $\eta \cdot Q \cdot (Q-1)/2$  is approximately 4,884,250. To summarize: by the time enrollment is complete the UIDAI should expect to have adjudicated matches for more than 10.88 million applicants: and more than 4.88 million among these will have been false matches.

To save writing, let us call an applicant whose suite of biometrics matches that of someone already enrolled a *matched applicant*: who will be falsely matched if he or she happens not to be enrolled. Now the numbers 10.88 million and 4.88 million may seem trifling when they are set beside 1.2 billion: and perhaps they are. But there is an asymmetry here which one should note: as we shall see

<sup>7</sup> In its paper the UIDAI computes, mistakenly, that only about 570 matches will occur for every one million enrollments: and the total number of matches they are expecting is only  $570 \cdot (1.2) \cdot 10^3 = 684,000$  or so

momentarily, the number of matches, and the number of false matches among these, will vary considerably between the initial and final stages of enrollment.

To estimate the difference here we need to refine our estimate of the factor  $\eta$  above, by using small values of  $Q$  now. Repeating the calculation of (2.3) with  $\lambda = 0.687400801$  and  $Q = 10^6$  we get

$$\begin{aligned} [\xi \cdot (1 - \xi)] / [1 - \xi + 10^6 \cdot \xi] &\approx \frac{\lambda 10^6}{10^{11} (10^6 + (1/2) \lambda)} = \frac{0.687395131}{10^{11}} \\ p(A^c) \cdot [\xi \cdot (1 - \xi)] / [1 - \xi + 10^6 \cdot \xi] &\approx \frac{(0.995) (0.687395131)}{10^{11}} = \frac{0.683958155}{10^{11}} \end{aligned}$$

Setting  $\eta_1 = (0.683958155)/10^{11}$  and with  $\gamma$  as above, and using  $\eta_1$  just as we used  $\eta$ , the matches expected for the first million enrolled are

$$\sum_{n=1}^{10^6-1} \beta(n) \approx \eta_1 \cdot 10^6 \cdot (10^6 - 1)/2 + \gamma \cdot (10^6 - 1) :$$

which is  $(0.341979078) \cdot [\frac{10^6}{10^2}] \cdot [\frac{10^6-1}{10^6}] + (0.4998248) \cdot \frac{10^6-1}{10^2}$  or  $3 + 4998 = 5001$  approximately: and only 3 among these will be falsely matched applicants. But the number of matches expected for the last million enrolled, and the falsely matched applicants among them, will be somewhat larger. To estimate these numbers set  $Q = (1.2) \cdot 10^9$  again and  $M = (1.2) \cdot 10^9 - 10^6$ ; the number of matches in the last million is

$$\begin{aligned} \sum_{n=M}^{Q-1} \beta(n) &= \sum_{n=M}^{Q-1} [p(A^c) \cdot \phi(n) + p(B|A) \cdot p(A)] \\ &\approx \eta \cdot \left[ \sum_{n=M}^{Q-1} n \right] + \gamma \cdot (Q - M) \end{aligned}$$

now, using (2.1) and (2.4) and (2.2) as before, which comes to 13135 approximately with  $\eta$  and  $\gamma$  as they are above: see the inset calculation.

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$$\begin{aligned} \sum_{n=M}^{Q-1} \beta(n) &\approx \eta \cdot \left( \sum_{n=M}^{Q-1} n \right) + \gamma \cdot (Q - M) \\ &= \eta \cdot [(M-1) \cdot (Q-M) + (Q-M+1) \cdot (Q-M)/2] + \gamma \cdot (Q-M) \\ &= (\eta/2) \cdot 10^6 \cdot [(2.4) \cdot 10^9 - 10^6 + 1] + \gamma \cdot 10^6 \\ &= (0.339184057) \cdot \frac{10^6}{10^2} \cdot \left[ \frac{(2.4) \cdot 10^9}{10^9} - \frac{10^6}{10^9} - \frac{1}{10^9} \right] + (0.004998248) \cdot 10^6 \\ &\approx (0.339184057) \cdot 10^4 \cdot (2.39899) + (0.004998248) \cdot 10^6 \\ &\approx 8137 + 4998 = 13135 \end{aligned}$$


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The numbers 5001 and 13135 are comparable enough. But let us count among the latter matched applicants those who are falsely matched: for which we get

$$\sum_{n=M}^{Q-1} \varepsilon(n) \approx \eta \cdot \left[ \sum_{n=M}^{Q-1} n \right]$$

or 8137 approximately: the calculation was just made in the inset passage above. To summarize: one expects about 5001 matches for the first one million enrolled, and 3 among the matched applicants should be falsely matched: in

the last one million enrolled one expects around 13135 matches, and among these matched applicants some 8137 should be falsely matched.

These exercises can be repeated for the sets or batches formed by successive millions of applicants. Let  $N_k$  denote the expected number of matches among the  $k$ -th million applicants, and let  $F_k$  denote the expected number of falsely matched applicants among these, we must now estimate a factor like  $\eta$  for different values of  $k$ . Setting  $Q_k = k \cdot 10^6$  and repeating the calculations for (2.3) with  $Q_k$  in place of  $Q$  we get

$$[\xi \cdot (1 - \xi)] / [1 - \xi + Q_k \cdot \xi] \approx \frac{\lambda}{10^6 (10^6 + k \cdot \lambda)}$$

with  $\lambda$  as above, and we have  $p(A^c) \cdot \phi(n) \approx \frac{p(A^c) \cdot \lambda}{10^6 (10^6 + k \cdot \lambda)} \equiv \eta_k$  from the relation (2.1) again, for each  $k$  and for values of  $n$  given by

$$[(k - 1) \cdot 10^6] = Q_{k-1} \leq n \leq [k \cdot 10^6 - 1] = Q_k - 1$$

now. So with  $\gamma \equiv p(B|A) \cdot p(A)$  as above and calculating as we did for the relation (2.2) we obtain the formulae

$$\begin{aligned} N_k &= \sum_n \beta(n) = \sum_n [p(A^c) \cdot \phi(n) + p(B|A) \cdot p(A)] \\ &\approx \eta_k \cdot \frac{10^6 \cdot [(2k-1) \cdot 10^6 - 1]}{2} + \gamma \cdot [(Q_k - 1) - Q_{k-1} + 1] \\ &= \frac{p(A^c) \cdot \lambda \cdot [(2k-1) \cdot 10^6 - 1]}{2 (10^6 + k \cdot \lambda)} + \gamma \cdot 10^6 \\ F_k &= \sum_n \varepsilon(n) \approx N_k - \gamma \cdot 10^6 \end{aligned}$$

with  $\sum_{i=r}^s i = \frac{(s-r+1)(s+r)}{2}$  giving the second line, for the sum of the numbers that lie between  $Q_{k-1}$  and  $Q_k$ . Using these formulae we can estimate and compare matches and false matches for the first and last  $m$  million applicants, respectively, for varying values of  $m$ . Write  $N_\alpha(m)$  for the matches among the first  $m$  million, and  $F_\alpha(m)$  for the false matches among these; write  $N_\omega(m)$  for the matches among the last  $m$  million and  $F_\omega(m)$  for the false matches among these. Here are some estimates of these counts, for a few values of  $m$ , among first and last aggregated millions.

$m$	$N_\alpha$	$F_\alpha$	$N_\omega$	$F_\omega$
1	5001	3	13135	8137
2	10011	13	26264	16267
5	25077	85	65609	40168
10	50325	341	131050	81067
100	534010	34180	1280208	780382
200	1136318	136665	2493042	1493392
250	1463057	213490	3074167	1824605



In its paper the UIDAI asserts that "the system will be able to scale to handle the entire population without significant drop in accuracy." The ratio of false matches to total matches expected, for any substantial subset of the population, seems an appropriate measure of accuracy here: the lower that ratio — the lower the chance of mistaken identification, that is to say the more accurate the system will be. So the ratios  $F_\alpha(m)/N_\alpha(m)$  and  $F_\omega(m)/N_\omega(m)$  are what we must attend to now: and here they are for the values of  $m$  with which we had computed above:

$m$	$F_\alpha/N_\alpha$	$F_\omega/N_\omega$
1	0.00059988	0.619489912
2	0.012858556	0.61936491
5	0.00338956	0.619091893
10	0.006775956	0.618595956
100	0.064006292	0.609574382
200	0.12027003	0.599024004
250	0.145920494	0.593528263

The expected ratio of false matches to total matches rises considerably between the initial and final stages of enrollment. One or ten million may not count as substantial subsets of a population, but a hundred million surely does, in a population of 1.2 billion; and we see from the fifth line here that, as recorded in the summary of findings, the chance of mistaken identification will increase almost ten-fold between the first and the last 100 millions enrolled. The probability of mistaken identification will only increase, of course, with any increase in the total population: should the population of India reach 1.5 billion, for instance, the false matches to total matches in the final 100 million will stand at 981,954 to 1,481,779 we estimate, giving a ratio of 2/3 almost between them.

Keeping the population at 1.2 billion however, we see that matters improve somewhat between the first 250 million enrolled and the last 250 million, for the drop in accuracy is less than five-fold now; but note how dramatically accuracy drops as enrollment rises. The expected number of matches in the second 100 million is  $1136318 - 534010 = 602308$ ; the expected number of false matches among these is  $136665 - 34180 = 102485$ ; and the ratio between these numbers becomes  $0.170153808$  for the second 100 million enrolled, while it was only  $0.064006292$  for the first 100 million. This last manoeuvre suggests the appropriate way to summarize the drop in accuracy: estimate and display the number of matches, and the false matches among these, for each successive million enrolled. Let us call these *false match ratios* for brevity. The graph in figure 1 shows the results: it plots both the cumulative and successive false match ratios as enrollment proceeds. The lower curve charts the cumulative ratios: by which is meant the ratio of false matches among *all* matches, of course, when a given number have been enrolled. The horizontal axis counts the population in millions, while the vertical axis records the respective ratios; the numerical

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labels display actual counts at each hundredth million.

Computing and summing with the formulae for  $N_k$  and  $F_k$  above gives us our revised estimate of 10,895,510 for the total count  $m(Q)$  of matches expected: among which one may expect 4,897,609 to be false matches. These are lower bounds for these counts: we have underestimated them by using the lower bound in (2) for the probabilities  $\phi(n)$ . But the using the upper bound  $n \cdot \xi$  will not change things too much. Write  $m^+(Q)$  for upper bound on the total number matches; we have

$$m^+(Q) = \sum_{n=1}^{Q-1} [p(A^c) \cdot n \cdot \xi + \gamma] = p(A^c) \cdot \xi \cdot \frac{Q(Q-1)}{2} + \gamma \cdot (Q-1)$$

then. Repeating the calculation for  $m(Q)$  above, with  $Q = 1.2$  billion again and with  $p(A^c) \cdot \xi$  in place of  $\eta$  there, yields 10,922,437 as an upper bound on matches, and 4,924,539 as an upper bound on false matches. The differences between the upper and lower bounds here are 0.002471385 and 0.005498601 as fractions of the respective lower bounds: and as these are marginal for the largest of our counts, we may safely go with the numbers listed above. The graph in figure 2 plots the differences, for successive millions, between false matches counted with the upper and lower bounds for  $\phi(n)$  respectively; and figure 3 plots these differences for all matches. Notice that these differences grow in the same way as enrollment proceeds: so using the upper bound for  $\phi(n)$  should make neither more pronounced, nor less, the differences between initial false match ratios and final false match ratios.

3.4 When a match occurs for a putatively new applicant, his or her suite of biometrics may match more than one suite of templates in the database: let us call such a suite of matching templates a *matched record*: and each matched record will have to be examined, now, to determine whether or not the match is a false one. To measure how efficient the process of enrollment is we shall have to estimate the total number of matched records that will have been found, by the time enrollment is complete, for all the matched applicants the UIDAI should expect. The process of estimation here is somewhat tortuous. Let  $q < n$  and suppose  $n$  individuals have already been enrolled. Let  $R_q(n)$  abbreviate the following circumstance: that at least  $q$  suites of templates in database will match the biometrics of the next applicant. We must estimate its probability: and, keeping with the notation we have been using, to do that we require the probability of the conditional circumstance  $[R_q(n)|A^c]$ : the circumstance that at least  $q$  suites of templates in database will match the biometrics of the next applicant  $S$  given that he or she is not in fact enrolled. The probability of a match occurring for  $S$  is  $1 - (1 - \xi)^n$  recall. the chance that his or her suite of biometrics will match the templates of some or other enrolled individual: which is the probability  $p[R_1(n)|A^c]$  also, then, the chance of finding at least one matched record for an unenrolled applicant. The chance that exactly one suite of templates in the database will match the biometrics of  $S$  is  $n \cdot \xi \cdot (1 - \xi)^{n-1}$  now: assuming, again, that matching with any one suite is independent of matching with any other. With this assumption the probability that exactly  $j$

suites of templates will thus match is  $C_{n,j} \cdot \xi^j \cdot (1 - \xi)^{n-j}$  then; so we have

$$p[R_q(n)|A^c] = \sum_{r=q}^n C_{n,r} \cdot \xi^r \cdot (1 - \xi)^{n-r} = 1 - \sum_{j=0}^{q-1} C_{n,j} \cdot \xi^j \cdot (1 - \xi)^{n-j}$$

The quantity on the right is the term  $\psi_q(n)$  of formula (3) in the summary of findings: which gives us the upper bound on  $p[R_q(n)|A^c]$  that we shall be using. It seems reasonable to suppose that  $p[R_{m+1}(n)|A] \approx p[R_m(n)|A^c]$ : the chance of finding at least  $m + 1$  matched records when the  $(n + 1)$ -st applicant is already enrolled should approximate, surely, the chance of finding at least  $m$  matched records were he or she not enrolled. So we have

$$\begin{aligned} p[R_q(n)] &= p[R_q(n)|A] \cdot p(A) + p[R_q(n)|A^c] \cdot p(A^c) \\ &= \psi_{q-1}(n) \cdot p(A) + \psi_q(n) \cdot p(A^c) \end{aligned}$$

for  $q > 1$ . We may assume independence of matches for different applicants: the chance that at least  $q$  matched records will be found for one applicant is not affected by whether or not that happens for any other. Write  $N$  for the total number of individuals to be enrolled, and for  $q > 1$  set

$$T_q = \sum_{n=1}^{N-1} p[R_q(n)] = p(A) \cdot \sum_{n=1}^{N-1} \psi_{q-1}(n) + p(A^c) \cdot \sum_{n=1}^{N-1} \psi_q(n)$$

$T_q$  will equal or exceed the total number of matched records found for those matched applicants whose suite of biometrics matches  $q$  suites of templates, at least, in the database. Write  $S_q$  for this latter set of matched applicants: we have  $S_q \supseteq S_{q+1}$  of course, and for the total count  $T$  of matched records we shall then have

$$\begin{aligned} (25) \quad T &= T_1 - T_2 + 2 \cdot (T_2 - T_3) + \dots + r \cdot (T_r - T_{r+1}) + \dots \\ &= T_1 + T_2 + \dots + T_{N-1} \end{aligned}$$

where  $N$  is the total population: since  $T_r = 0$ , of course, when  $r$  equals or exceeds that total. But we may very reasonably expect to have  $T_r \approx 0$  before  $r$  gets at all large: and we shall now approximate the few terms, only, that we shall need to safely count  $T$ . We use the upper bound in (3) as our approximation for  $\psi_q(n)$  here. We have  $T_1$  already: that will equal the total number of matched applicants, of course, and at the end of the last section we had computed that as 10,922,437 using  $\psi_1(n) = 1 - [1 - \xi]^n \approx n \cdot \xi$  as our approximation. Now for  $N = (1.2) \cdot 10^9$  we obtain the approximations

$$\begin{aligned} T_2 &= p(A) \cdot \sum_{n=1}^{N-1} \psi_1(n) + p(A^c) \cdot \sum_{n=1}^{N-1} \psi_2(n) \approx 2745454 \\ T_3 &= p(A) \cdot \sum_{n=1}^{N-1} \psi_2(n) + p(A^c) \cdot \sum_{n=1}^{N-1} \psi_3(n) \approx 219.9 \\ T_4 &= p(A) \cdot \sum_{n=1}^{N-1} \psi_3(n) + p(A^c) \cdot \sum_{n=1}^{N-1} \psi_4(n) \approx 0.6 \end{aligned}$$

The calculations are in the inset section following. We have proceeded by neglecting fractions less than  $10^{-3}$  in the counts of integers we are making: and

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we have shown that  $T_5$  may be taken as zero. As  $T_r$  decreases with increasing  $r$  we shall need only these approximations to count  $T$ .

3.4.1 Set  $\lambda = 0.687400801$  for convenience, as before, so that  $\xi = \lambda \cdot 10^{-11}$  again; and write  $a$  for  $p(A) = 0.005$  now. With  $\psi_q(n) \approx [\xi^q / (q-1)!] \cdot \prod_{r=0}^{q-1} (n-r)$  from formula (3) in Section 1 we get

$$\begin{aligned} T_2 &= p(A) \cdot \sum_{n=1}^{N-1} \psi_1(n) + p(A^c) \cdot \sum_{n=1}^{N-1} \psi_2(n) \\ &\approx a \cdot \lambda \cdot 10^{-11} \cdot \left[ \sum_{n=1}^{N-1} n \right] + (1-a) \cdot \lambda^2 \cdot 10^{-22} \cdot \left[ \sum_{n=1}^{N-1} n \cdot (n-1) \right] \\ &= a \cdot \lambda \cdot 10^{-11} \cdot \left[ \sum_{n=1}^{N-1} n \right] + (1-a) \cdot \lambda^2 \cdot 10^{-22} \cdot \left[ \sum_{n=1}^{N-1} n^2 - \sum_{n=1}^{N-1} n \right] \\ &= a \cdot \lambda \cdot 10^{-11} \cdot N \cdot (N-1)/2 + (1-a) \cdot \lambda^2 \cdot 10^{-22} \cdot N \cdot (N-1) \cdot (2N-1)/6 \\ &\approx a \cdot \lambda \cdot 10^{-11} \cdot N^2/2 + (1-a) \cdot \lambda^2 \cdot 10^{-22} \cdot 2 \cdot N^3/6 \\ &= (0.247464288) \cdot 10^{-13} \cdot 10^{18} + (0.270810583) \cdot 10^{-22} \cdot 10^{27} = 274545.3463 \end{aligned}$$

We discard  $(1-a)\lambda^2 10^{-22} \cdot \left[ \sum_{n=1}^{N-1} n \right] < N^2/10^{22} < 10^{-3}$  in going from line 3 to line 4 above; and in going from line 4 to line 5 we discard  $(a\lambda/2)N/10^{11} < 10^{-4}$  from the first term, and from the second term all the summands where  $N$  has power at most 2, doing as we did in going from line 3 to line 4. Continuing, we have

$$\begin{aligned} T_3 &= p(A) \cdot \sum_{n=1}^{N-1} \psi_2(n) + p(A^c) \cdot \sum_{n=1}^{N-1} \psi_3(n) \\ &\approx a \cdot \lambda^2 \cdot 10^{-22} \cdot \left[ \sum_{n=1}^{N-1} n \cdot (n-1) \right] \\ &\quad + [(1-a) \cdot \lambda^3 \cdot 10^{-33}/2] \cdot \left[ \sum_{n=1}^{N-1} n \cdot (n-1) \cdot (n-2) \right] \\ &= a \cdot \lambda^2 \cdot 10^{-22} \cdot \left[ \sum_{n=1}^{N-1} n^2 - \sum_{n=1}^{N-1} n \right] \\ &\quad + [(1-a) \cdot \lambda^3 \cdot 10^{-33}/2] \cdot \left[ \sum_{n=1}^{N-1} n^3 - 3 \cdot \sum_{n=1}^{N-1} n^2 + 2 \cdot \sum_{n=1}^{N-1} n \right] \\ &\approx a \cdot \lambda^2 \cdot 10^{-22} \cdot \left[ \sum_{n=1}^{N-1} n^2 \right] + [(1-a) \cdot \lambda^3 \cdot 10^{-33}/2] \cdot \left[ \sum_{n=1}^{N-1} n^3 \right] \\ &= a \cdot \lambda^2 \cdot 10^{-22} \cdot N \cdot (N-1) \cdot (2N-1)/6 \\ &\quad + [(1-a) \cdot \lambda^3 \cdot 10^{-33}/2] \cdot \left[ \sum_{n=1}^{N-1} n^3 \right] \\ &\approx a \cdot \lambda^2 \cdot 10^{-22} \cdot 2 \cdot N^3/6 \\ &\quad + [(1-a) \cdot \lambda^3 \cdot 10^{-33}/2] \cdot [N^4 - 2N^3 + N^2]/4 \\ &\approx a \cdot \lambda^2 \cdot 10^{-22} \cdot 2 \cdot N^3/6 + [(1-a) \cdot \lambda^3 \cdot 10^{-33}/2] \cdot N^4/4 \\ &= (0.001360857) \cdot 10^{-22} \cdot 10^{27} + (0.083769935) \cdot 10^{-33} \cdot 10^{36} = 219.855635 \end{aligned}$$

In going from the 3rd equality to the 4th approximation we have done with the first term just as we did in computing  $T_2$ , which was to discard summands where the power of  $N$  is at most 2; and in the second term we discard summands where the power of  $N$  is 3 or less, for these will not exceed  $10^{-5}$  in absolute value. We discard terms for the same reasons in going from the 5th equality to the 7th approximation. Going on in this fashion we obtain

$$\begin{aligned} T_4 &= p(A) \cdot \sum_{n=1}^{N-1} \psi_3(n) + p(A^c) \cdot \sum_{n=1}^{N-1} \psi_4(n) \\ &\approx [a \cdot \lambda^3 \cdot 10^{-33}/2] \cdot \left[ \sum_{n=1}^{N-1} n \cdot (n-1) \cdot (n-2) \right] \end{aligned}$$

$$\begin{aligned}
 & + [(1-a) \cdot \lambda^4 \cdot 10^{-44}/3!] \cdot [\sum_{n=1}^{N-1} n \cdot (n-1) \cdot (n-2) \cdot (n-3)] \\
 \approx & [a \cdot \lambda^3 \cdot 10^{-33}/2] \cdot [\sum_{n=1}^{N-1} n^3] + [(1-a) \cdot \lambda^4 \cdot 10^{-44}/3!] \cdot [\sum_{n=1}^{N-1} n^4] \\
 \approx & [a \cdot \lambda^3 \cdot 10^{-33}/2] \cdot N^4/4 \\
 & + [(1-a) \cdot \lambda^4 \cdot 10^{-44}/3!] \cdot [N^5/5 - 10(\sum_{n=1}^{N-1} n^3 + n^2) - 5(\sum_{n=1}^{N-1} n) - N] \\
 \approx & a \cdot \lambda^3 \cdot 10^{-33} \cdot N^4/8 + [(1-a) \cdot \lambda^4 \cdot 10^{-44} \cdot N^5]/[3! \cdot 5] \\
 \approx & (0.000420954) \cdot 10^{-33} \cdot 10^{36} + (0.018426727) \cdot 10^{-44} \cdot 10^{45} = 0.60522127
 \end{aligned}$$

and the rationale for discarding terms above should be clear now from what has already been said. Proceeding in this manner will yield

$$\begin{aligned}
 T_5 & \approx [a \cdot \lambda^4 \cdot 10^{-44} \cdot N^5]/[3! \cdot 5] + [(1-a) \cdot \lambda^5 \cdot 10^{-55} \cdot N^6]/[4! \cdot 6] \\
 & \approx 0.000092597 + 0.0003166637 \approx 0
 \end{aligned}$$

We may take  $T \approx T_1 + T_2 + T_3 + T_4$  now: and since we have computed with upper bounds for our probabilities  $\psi_n(q)$  we may safely suppose that

$$T \approx 10,922,437 + 274,545 + 220 + 1 = 11,267,203$$

is what the count of matched records will come to, at most, by the time the entire population of 1.2 billion has been enrolled. At the end of section 3.3 we had computed an upper limit of 10,922,437 on total matches, and an upper limit of 4,924,539 on false matches among these. and with 11,267,203 for an upper limit on matched records we see that, as asserted in the summary of findings, to determine which matches are false only rarely will more than one matched record have to be examined: and things should be so through the course of enrollment even though the number of matched records examined for each match will increase somewhat in the final stages.

3.5 We close the main part of our essay by registering a very minor complication. We have taken a biometric for a real or binary vector: which it usually is. The 'numerized representations' of fingerprints may sometimes be two-dimensional patterns, though, of certain 'minutiae' that are characteristic of them: see [6] for a discussion. But no grave consequences follow for the calculations done here: the specified probabilities of distances falling below or above a threshold will have to be replaced, only, with the chances of spatial patterns matching either too closely, on the one hand, or not matching closely enough, on the other.

#### 4 Operational clones

At the end of the introductory section we had touched on a particular complication that will attend the biometric identification of a large population: which

is that enrollment must be conducted simultaneously through several venues. The UIDAI would have to enroll applicants for a UID through many hundred venues, surely, if the biometric identification of 1.2 billion people is to be completed in good time. Now the suite of identifying biometrics obtained from an applicant at any one venue will have to be compared against those obtained from applicants at every other venue and one must ensure that matching will be uniformly done regardless.

The question had been broached, in passing, in 2.1 above; we consider here it in a somewhat different light. Let  $F$  be some particular identificatory feature. We must distinguish once more the *scanning* of  $F$  which produces the *image* we mentioned in Section 2 — from the *processing* of that image into a numerized representation of the feature: and the combined process of scanning and processing may be termed the *metrizing* of  $F$ . We must regard a biometric device as a scanner paired to a image processor now: and where many scanners are paired to one processor we shall take each such pairing for a different *instance* of the same biometric device. Let  $M$  be some make of a device to metrize the feature  $F$ : there will be one instance of  $M$  for each venue now. Let  $u$  denote, generically, the numerized representation of  $F$  produced by any instance of  $M$ . For any such representation  $u$  let  $O(u)$  denote the particular instance of  $F$  which was scanned, by some or other instance of  $M$ , in producing it. For any two such representations  $u_1$  and  $u_2$  let  $S(u_1, u_2)$  denote the circumstance that they were both produced by the *same* instance of  $M$ ; and let  $\neg S(u_1, u_2)$  denote the circumstance that they were produced by different instances of  $M$ . Let  $d(u_1, u_2) \equiv x$  denote the distance between  $u_1$  and  $u_2$  under whatever metric has been chosen to measure their difference. In the notation of Section 2 the distance  $x$  may be taken for a value of the random variable  $X^\delta$  if  $S(u_1, u_2)$  obtains but  $O(u_1)$  is not  $O(u_2)$ ; and for a value of the variable  $X^\sigma$  if  $S(u_1, u_2)$  obtains and  $O(u_1)$  is  $O(u_2)$ . Now the following seems a reasonable condition to impose if many instances of  $M$  are all to be regarded as operational clones of each other

$$c^\delta \quad p[x < \tau | \neg S(u_1, u_2)] = p[x < \tau | S(u_1, u_2)] \quad \text{if} \quad \neg [O(u_1) = O(u_2)] \\ \text{for any choice of threshold } \tau.$$

The condition asks that, given different instances of the feature  $F$ , the chance of a match be the same whether or not their numerized representations are produced by the same instance of the device  $M$ . This will ensure that identification error does not vary between venues. For verification we need to ensure as well that, given any one instance of  $F$ , the chance of no match occurring between different representations will be the same whether or not these are produced by the same instance of  $M$ : and the analogous condition would be

$$c^\sigma \quad p[x > \tau | \neg S(u_1, u_2)] = p[x > \tau | S(u_1, u_2)] \quad \text{if} \quad O(u_1) = O(u_2) \\ \text{for any choice of threshold } \tau.$$

There would be other ways, surely, in which operational clones could be speci-

fied. But the literature seems not to address the problem: most likely because, for most uses of biometric identification, templates will be formed with a single instance of a device. A manufacturer may undertake to guarantee that each instance of a biometric device he makes is an operational clone of every other: but they do not seem to do as a matter of course. So when many venues are used for enrollment the keepers of identity will very likely have to confirm for themselves that all their instances of a single device are indeed operational clones of each other. There would be many ways, again, to test whether or not many instances of a device are such: but some standard way of testing for the equality of distributions should serve for a rough and ready check here.

4.1 The classic Kolmogorov-Smirnov method, for instance, could provide a simple check: here is one way in which that might be used. Comparisons will most often be made between numerized representations produced by different instances of the device: and for pairs  $(u_1, u_2)$  where  $\neg[O(u_1) = O(u_2)]$  and  $\neg S(u_1, u_2)$  we might regard the distances  $x = d(u_1, u_2)$  as the values of a random variable  $X_0^\delta$  now: which is analogous to the distribution  $X^\delta$  we have for the device  $M$  of course. Let  $G_0$  be the cumulative distribution function of  $X_0^\delta$ :  $G_0(t) \equiv p[X_0^\delta \leq t]$  for any real number  $t$ . With any good sized random sample from  $X_0^\delta$ , and for any suitably small  $\varepsilon > 0$ , one can construct bounding curves  $G_{0,\varepsilon}^-$  and  $G_{0,\varepsilon}^+$  such that

$$p[G_{0,\varepsilon}^-(x) \leq G_0(x) \leq G_{0,\varepsilon}^+(x)] = 1 - \varepsilon$$

for each real number  $x$ : so for any value  $x$  of  $X_0^\delta$  the probability is  $\varepsilon$ , only, that  $G_0(x)$  does not lie in the interval  $[G_{0,\varepsilon}^-(x), G_{0,\varepsilon}^+(x)]$ . The keepers of identity should be able to construct such bounding curves quite soon after enrollment has begun. For any instance of  $M$  they should be able, then, to obtain a random sample of pairs  $(u_1, u_2)$  with  $\neg[O(u_1) = O(u_2)]$  which have been produced by that instance itself: and the distances between the elements of each pair here may be taken for a random sample of values drawn from  $X^\delta$  now. These values can be used to construct an estimate  $\hat{g}$  of the cumulative distribution function of  $X^\delta$ : whose construction is such as allow one to readily check whether or not, for each  $x$ , the value  $\hat{g}(x)$  lies in  $[G_{0,\varepsilon}^-(x), G_{0,\varepsilon}^+(x)]$ . With any luck that will be the case: and should each instance of  $M$  pass this test we may suppose that condition  $c^\delta$  has been met.

How such a procedure might be repeated for  $c^\sigma$  should be evident, provided only that a random sample can be drawn from the analogous distribution  $X_0^\sigma$ . For that the keepers of identity will have to obtain, from each of a suitably large random collection of applicants, pairs  $(u_1, u_2)$  of numerized representations whose elements are produced by different instances of  $M$ : which requires that each of these applicants have the feature  $F$  scanned at two distinct venues, as well as twice at some one venue, obviously, to get sampled values of  $X^\sigma$ .

Our treatment might seem overly elaborate. Practically considered the constraint is that, for a biometric device or arrangement of a given make, the images produced by different instances of the scanner should be indistinguishable to the processor that converts these images into numerized representations: and this condition might be routinely satisfied by certain sorts of devices. For

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a given make of fingerprint scanner, for instance, the usual protocols of 'quality control' might ensure that the scans output by different machines would be indistinguishable to any available method, even, of processing them into numerized representations: and such would very likely be the case whenever the image produced by a scanner is simple enough to be humanly scrutable. But matters would be otherwise when the output of the scanner is informationally dense: as the image produced by scanning an iris would surely be: and only empirical testing could ensure, now, that the images produced by different instances of the scanner are indeed indistinguishable to the processor.

There is no indication, in their publications, that the UIDAI has sought to ensure that different instances of their devices will be operational clones of each other. Discovering that they are not, once enrollment has proceeded far, will be inconvenient. But we note again that the literature seem not to consider the matter. The biometric identification of the Phillipine population was undertaken a few years ago; and the process seems to have been well assessed. Curious readers may look at the relevant articles in [5] now. None of these take up our question; but we note that only fingerprints were used there.

## 5 Two caveats

It seems prudent to record a caveat regarding the templates that are stored in biometric databases. Where time and resources permit a template is constructed by *summarizing* more than one numerized representation of an organic object: which object would be, of course, an instance of some identificatory feature  $F$  here. The word "sample" is now used for the primary numerized representation. If each representing sample is a real vector the template is often just the mean of the samples: as in [1]. When these samples are binary vectors there would be ways, presumably, of extracting some binary summary as a template. but we have not encountered any discussion under this head. Where templates are summaries of representing samples the random variable  $X^\sigma$  of 2 1 records the distribution of distances between samples and templates representing identical organic objects; while the random variable  $X^\delta$  records the distribution of distances between samples and templates representing distinct objects; and these are the *genuine* and *inter-template* distributions, respectively, of [1].<sup>8</sup> The UIDAI is very likely using representing samples themselves as templates. We do not know how the manufacturers of their devices have tested them: but if the specified errors were estimated using summarized templates, then some difference between specification and actual performance should have been expected: and perhaps the observed scale of the difference was to be expected as well. Another reason for the considerable difference between specification and performance might lie in our assuming, mistakenly perhaps, the independence of the

<sup>8</sup> One could, as well, compare a sample representing one object to a template representing another organic object: and these distances could be taken for values of third random variable  $X^\epsilon$  now which [1] calls the *impostor distribution*. But the utility of the latter seems to lie in comparing biometric devices of different makes: so we shall not consider it further



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metrized features. There is reason to suspect that such independence does not actually obtain for fingerprints: and that is the other caveat we must register.

Hans V. Mathews, 12/2012

#### references

We have referred more than once to the paper [1]; and 2.1 had mentioned [2] in the course of discussing specified errors. The collection [5] enlarges on the complexities of biometric identification; and all three documents are freely available online. We considered [4] in some detail; it is available on the website of the UIDAI. Our source for the specified errors of their devices was [3]: which appeared online in the journal *Pragati* early in 2012, and presumably remains available.

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Biometric identification : device specification and actual performance considered for the operation of the UIDAI

Hans Varghese Mathews

Abstract : Mistaken identification is a particular problem in the biometric identification of a large population. The Chance of mistaken identification, which is the conditional probability that individuals are different even though their biometrics match, will increase as more and more individuals are identified. The Government of India is currently engaged in biometrically identifying its more than 1 billion citizens and we find that the probability of mistaken matches will increase considerably between the initial and final stages of the exercise. Here are some indicative estimates. That probability is expected to increase from 0.0064006 in the first 100 million identified to 0.609574382 in the last 100 million. The actual number of matches that will occur in the final stages is not negligible 1,280,208 matches are expected for the last 100 million identified : and 780,382 of these will be mistaken matches. The work to be done in deciding when a match is mistaken will depend on how many previously identified persons a given individual is matched with. We are able to conclude in the case at hand that only rarely will there be more than one such matching person. Biometric devices may not perform as well in the field as they do in the laboratory when they are employed for the rapid identification of a large population. The accuracy of device is measured as the probability that a match will occur between two randomly

chosen individuals. Manufactures of devices specify accuracy through laboratory estimates and for the suite of devices being used by the Government of India we estimate that accuracy in the field is six-fold lower than accuracy in the laboratory.

## 1. Introduction

The Unique identity Authority of India, the UIDAI for short, is currently engaged on the biometric identification of the entire population of India. In what follows we shall be attempting an assessment of that ongoing exercise and our primary concern is to appropriately assess the actual performance of the identification procedure, in the field, against such performance as might be expected from the technical specifications of the devices being used and the matching protocol that is being followed. In the next section we shall say more precisely what a biometric is, make explicit the relevant technical specifications of the devices that produce them, say exactly what matching amounts to, and then derive, from all this, the particular measures we shall need for our operational assessment. We begin with our findings.

Annexure RA-9

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GOVERNMENT OF INDIA  
TECHNOLOGY CENTRE  
Unique Identification Authority of India (UIDAI)  
Salarpuria campus, Outer ring road  
Bengaluru-560 103



Ref: TC-UID/Admin/RTI/06/Vol XII/2014-2015

Date: 13.11.2014

To

Shri Mathew Thomas  
18A, Adarsh Vista, Basavanagar,  
Marathahalli PO,  
Bangalore-560037

Sub Information w.r.t RTI Application of Shri. Mathew Thomas - Reg  
Ref: F-12013/786/2014/RTI-UIDAI dated 14.10.2014 ltr received on 21.10.2014.

With reference to the above RTI Query of Shri. Mathew Thomas the following information is furnished.

- a) Please give the total number of persons who did not possess any ID (identification document) but were enrolled in UID/Aadhaar and were issued UID/Aadhaar numbers  
Reply: Persons who did not possess any ID documents can be enrolled for Aadhaar by means of HOF or introducer. Total number of such enrolments is 2,02,39,199.
- b) Total number of persons who produced any ID document along with their application for enrollment in UID/Aadhaar and were enrolled on the basis of such ID documents  
Reply: Total number of persons who produced any ID document along with their application for enrollment in Aadhaar: 68,49,34,968.
- c) Total number of persons enrolled in NPR who were issued UID/Aadhaar numbers  
Reply: Total number of Aadhaar generated through RGI (who follow NPR process): 19,15,12,297.
- d) Date from which, people enrolled in NPR were issued UID/Aadhaar numbers  
Reply: Date from which RGI packets processed: 25<sup>th</sup> Feb 2011.
- e) please state whether any intimation is sent to Registrar General of India & Census Commissioner when a person enrolled in NPR is issued a UID/Aadhaar number, if so a sample or template to indicate the information so sent  
Reply: Yes, Template enclosed. Information is encrypted with Registrar's Key.

(K. Maneesha Raman)  
Dy. Director & CPIO

Copy to:

Shri. Rajnish Jha, Dy. Director & CPIO, 2<sup>nd</sup> Floor, Tower-I, Jeevan Bharati Building, Connaught Circus, New Delhi-110 001. W.r.t ltr no. F-12013/786/2014/RTI-UIDAI dated 14.10.2014.

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TECHNOLOGY CENTRE

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Sd/-  
(K.Maneesha Raman)  
Dy. Director & CPIO

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Sh. S.A. Ramesh Rangan  
Managing Director,  
State Bank of India



Sh. Montek Singh Ahluwalia  
Deputy Chairman, Planning Commission  
Government of India



Sh. Nandan Nilekani  
Chairman, UIDAI



Sh. Rajinder Gupta  
Chairman  
Trident Group



TRIDENT GROUP

Extends gratitude to

Sh. Montek Singh Ahluwalia  
Deputy Chairman, Planning Commission  
Government of India

and

Sh. Nandan Nilekani  
Chairman, UIDAI

For felicitating the Soft Launch of Aadhaar Linked  
Disbursal of Salary to the Employees of Trident Group  
-The first corporate sector initiative on APB in India  
on 13th January, 2014

Aadhaar is a technology platform which enhances:

- o Transparency in salary disbursement
- o Elimination of forged identities in recruitments
- o Facilitation of social benefits

#### About Trident:

Trident Group is a leading manufacturer of Terry Towels, Paper, Yarn and Chemicals with an array of customers spread across 75 countries. With a compounded Annual Growth Rate (CAGR) of more than 30 per cent, Trident has established itself as one of the fastest growing groups of India. Recipient of numerous corporate awards Trident has also frequently received accolades from its patrons in recognition for delivering high quality standards and for the customer centric approach

ECONOMIC TIMES DT. 13.01.2014



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Annexure RA-10

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Sh. Montek Singh Ahluwalia

Deputy Chairman, Planning Commission

Government of India

And

Sh. Nandan Nilekanj

Chairman, UIDAI

For felicitating the Soft Launch of Aadhaar Linked  
Disbursal of Salary to the Employees of Trident Group –  
The First corporate Sector Initiative on APB in India on  
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Economic Time Dt. 13.01.2014

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